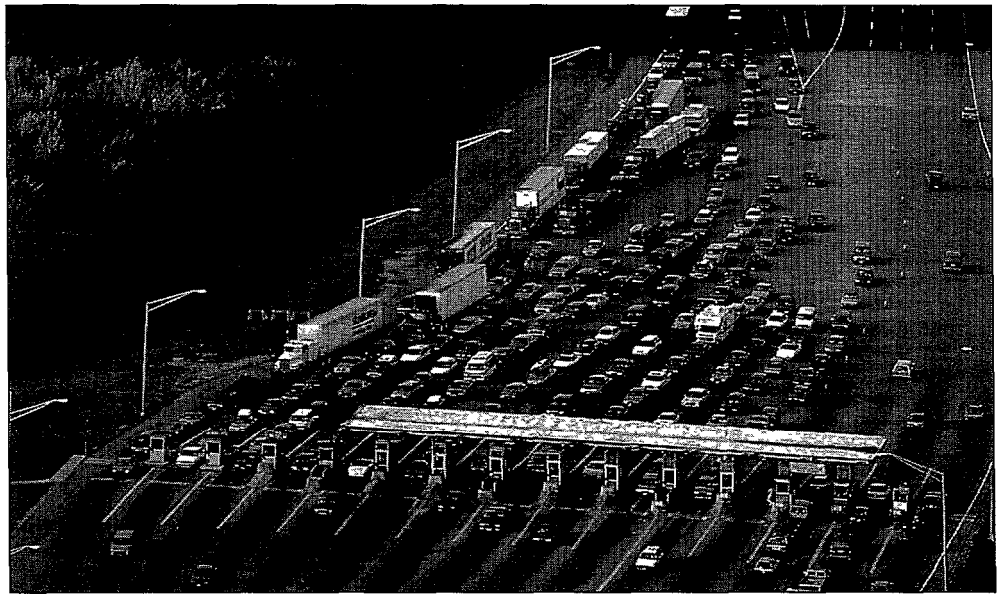


IN THIS CHAPTER..

IMPLEMENTATION, FUNDING AND INSTITUTIONAL MEASURES

Successful program and project implementation depends on several key factors discussed in this chapter.

First, most actions require some funding to be implemented. For the actions discussed in the Toolbox, the level of funding can range from $10,000 for marketing efforts to $1 billion for large scale transit and highway projects. Each type of project will have its own sources of funds with varying degrees of requirements attached to obtaining funding from each. Second, institutional relationships and structures often guide the approach that is taken to implement transportation projects. These relationships could be formally established in statute, or they could be informal (and temporary) partnerships arranged to implement a specific project. Third, transportation planning and investment decision-making is characterized in today's world as being customer-oriented. This means that the implementation of most of the actions described in previous chapters should be preceded with a careful assessment and incorporation into the planning and decision-making process of those who will benefit from implementation and those who will be impacted. Market research and public involvement thus become critical elements of successful implementation.

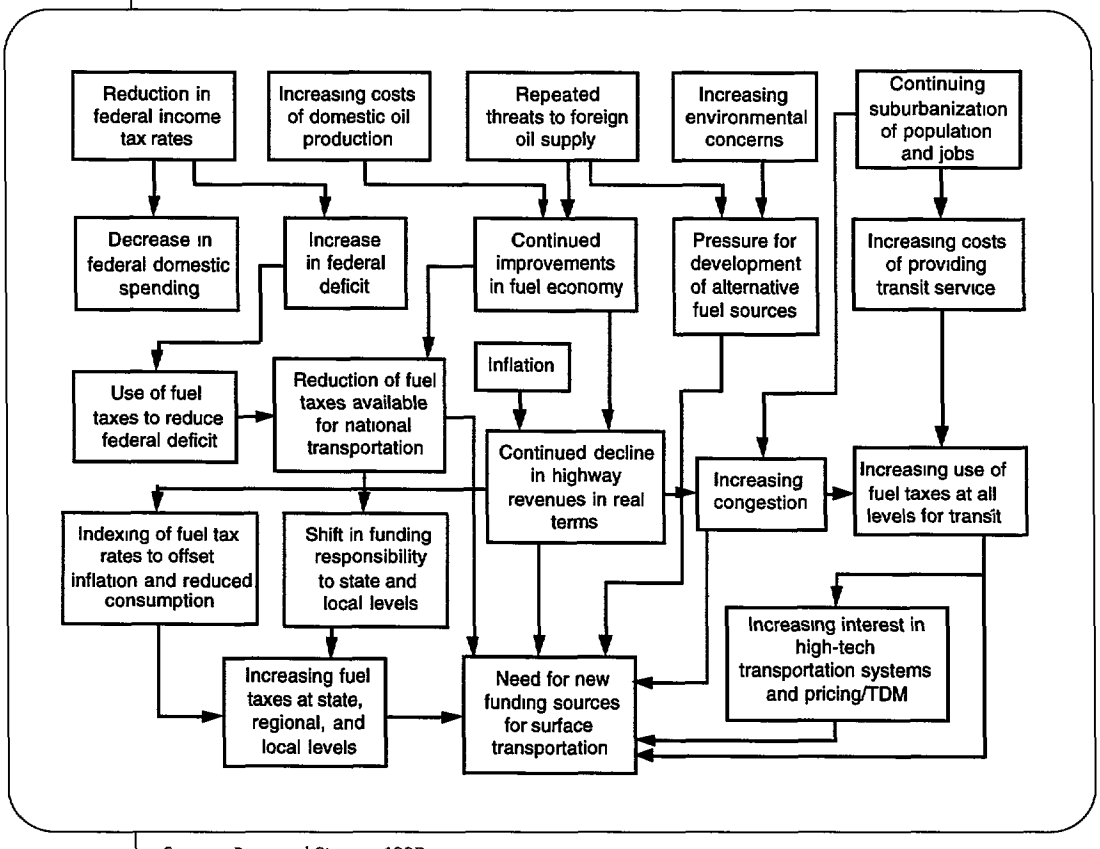
More than any other factors in implementation, funding, institutional capability and market research/public involvement are critical to project or program success. Without adequate capital and operations/maintenance-funding, the ability of transportation officials to preserve and enhance the transportation system will be severely constrained. Without institutional capability and flexibility, the organizations responsible for implementation might be unable to respond to the changing implementation environment. And without knowing your market and involving them in the decision-making process, you might be trying to implement the wrong project design. In this sense then, funding, institutional measures, and market research/public involvement are per se not techniques to reduce congestion or enhance mobility, but are necessary prerequisites for any improvements to be made on the transportation system.

More than any other factors in implementation, funding institutional capability and market researchlpublic Involvement are critical to project or program success.

(TRADITIONAL FUNDING SOURCES

For many years, the transportation sector has been the beneficiary of large sums of dollars devoted to the improvement of the transportation system. However, beginning in the late 1970's, several trends in transportation finance began to add pressure on transportation officials to seek alternative sources of funding (see Figure 7-l). Most importantly, the

Figure 7.1: Trends Relating to Transportation Finance



Source. Reno and Stowers 1995

Fuel tax as a revenue generator has been the basis for most of the highway infrastructure finance in the United States over the past 40 years.

ISTEA required that transportation plans and programs be financially constrained, meaning that realistic funding sources must be associated with all proposed transportation projects in the region. The following sections discuss different sources of funding for transportation infrastructure and services.

Fuel Taxes

Description: The federal government, all 50 states, the District of Columbia and several metropolitan areas currently levy taxes on gasoline and other motor fuels. This form of revenue generation has been the basis for most of the highway infrastructure finance in the United States over the past 40 years. The federal government spends most of its funds generated by such taxes for transportation purposes (a portion of these user fees currently goes to deficit reduction) as do the preponderance of the states and localities. As of 1993, users of the highway system contributed $57 billion toward possible investment in road improvements covering approximately 84 percent of the transportation expenditures of all levels of government in the United States (Bureau of Transportation Statistics 1996). At the federal level, the federal gas tax (currently 18.4 cents per gallon) produces approximately $15 billion each year that goes into the Highway Trust Fund. Many states have their own highway trust funds, and some such as Maryland have a transportation trust fund that receives the state user charges on all forms of

transportation in the state. It is of interest to note that in current dollars the price of gasoline in the United States has changed little over the past 15 years [a 0.1 percent change between 1982 and 1993] (U.S. DOE 1995).

Even though fuel taxes have traditionally been the major source of highway revenues, there are several concerns with the stability of this funding source over the next 20 years (Reno and Stowers 1995).

- Revenues from fuel taxes will fail to keep pace with inflation in that rates are usually fixed and not indexed to the rate of inflation.
- Indexing fuel taxes to the price of fuel can provide a roller coaster effect, with the revenues increasing or decreasing depending on fuel price.
- Fuel efficiency increases will reduce the revenue collected per mile of travel.
- The combined effects of inflation and increased fuel efficiency will lower the real yields of fuel taxes per mile, while costs per mile will not decrease.
- Petroleum-based fuels may become more scarce, or more risky, accelerating a switch to non-petroleum based fuels.
- Taxation of alternative fuels can complicate the revenue-raising efforts of all levels of governments.
- Reliance on fuel taxes leaves the door open to proposals to subsidize alternative fuels by taxing them at a lower rate or not taxing them at all.
- The opportunity to use advanced vehicle identification technologies may render fuel taxes obsolete as a means of measuring vehicle use.
- The potential of electric or alternative fueled vehicles raises the challenge of measuring and reporting fuel consumption by these vehicles.

Although fuel taxes will likely remain the major source of transportation revenue in the foreseeable future, these concerns suggest that officials should be looking at a variety of funding sources so that a transportation program is not dependent on one source of funds.

Although fuel taxes will likely remain the major source of transportation revenue in the foreseeable future, officials should be looking at a variety of funding sources so that a transportation program is not dependent on one source of funds.

Benefits/Costs: Fuel taxes are an effective means of generating revenue for transportation improvements. The reliability of the revenue stream (not necessarily the total amount generated) makes them attractive as a basis for issuing bonds which provide "up front" financing for construction projects. Their attractiveness as a means of raising revenue lies in the direct relationship between those who pay and those who benefit. That is, the greater the use of the highway system, the more contribution to its upkeep and expansion. In addition, most governments are already structured to collect gas tax receipts and thus increasing the amount of the tax should not overly burden the institutional structure for collecting the additional revenues.

In many debates on raising the gas tax, opponents often claim that a gas tax increase will have a serious economic impact on a region's or state's economy. This impact is described in terms of jobs lost and reduced economic competitiveness. These claims are usually based on general supply/demand relationships that imply a cause and effect linkage between gas price as one factor influencing economic decisions, and thus the economic health of a region. There is little direct causal evidence to suggest this is the case. However, there is an equity concern about using the gas tax to fund transportation infrastructure. Lower income households will pay a greater share of a given amount of fuel taxes than they will for many other types of taxes, and in comparison to total household income. Therefore, the distributional impacts of raising fuel taxes must be carefully considered before undertaking such action.

Implementation: Legislation and/or a referendum are usually required to implement a gas tax. Because of this, the politics surrounding a proposed gas tax increase can be quite volatile. Experience from successful efforts in the United States suggests that the following steps are necessary to increase a gas tax:

- Clearly define in understandable terms the needs that will be addressed by increased funding.
- Develop a comprehensive package of transportation improvements so that voters can see what they will get for increased taxes.
- Create a consensus among transportation agencies that an increase is necessary.
- Have advanced negotiations with key actors in the policy process (e.g., governor, legislative leadership, business community, transportation organizations, environmental groups, etc.).
- Provide opportunities for public input and build support among public groups.
- Work with the media to get favorable coverage.
- Establish a credible focal point of overall leadership.

References

Bureau of Transportation Statistics. 1996. National Transportation Statistics, 1996, U.S. Department of Transportation, Washington D.C.

Reno, A. and J. Stowers. 1995. Alternatives to Motor Fuel Taxed for Financing Surface Trasnportation Improvements, NCHRP Report 377, Transportation Research Board, Washington D.C.

U.S. Department of Energy (DOE). 1995. Transportation Energy Data Book: Edition 15, Report ORNL-6856, May.

General Revenues

Description: Approximately 30 percent of the total revenues for transportation investment in the United States come from non-user fee sources (Bureau of Transportation Statistics 1996). A large portion of the revenues comes from state and local governments that collect fees and taxes (e.g., property, sales and/or income taxes, lotteries, lease income, business taxes, etc.) to finance government operations. In many cases, local governments have to allocate these funds to compensate for a reduction in funds from other sources (e.g., the federal government). Several states have developed transportation and economic development programs that target funds on those projects whose primary intent is to foster economic development. In most cases, these funds come from the state's general revenue stream.

Benefits/Costs: The benefit of using general revenue funds for transportation purposes lies mainly in the general public acceptance of taxation as a mechanism of supporting government (although the amount of taxation can be debated endlessly). Also, some forms of general revenue taxes (e.g., sales tax) can provide substantial levels of funds to transportation if dedicated for that purpose. The major disadvantage of such funds is that they compete with other community needs for yearly budget allocations. Thus, a long-term transportation program should not be based on the allocation of general revenues unless the taxing mechanism (e.g., sales tax) is devoted strictly for transportation purposes. As with the fuel tax, caution needs to be exercised in using those types of taxes (e.g., sales tax) that have a disproportionate impact on low income groups.

Implementation: The use of general revenue sources for transportation funding will be subject to the politics surrounding budget allocations. Thus, the use of these funds would be successful only if proponents are able to convince officials that transportation activities warrant the use of such funds. Where special taxes are raised specifically for transportation purposes (e.g., a dedicated sales tax), the characteristics of successful implementation are the same as those described in the section on fuel taxes.

A large portion of transportation revenues comes from state and local governments that collect fees and taxes.

References

Bureau of Transportation Statistics. 1996. National Transportation Statistics, 1996, U.S. Department of Transportation, Washington D.C.

Bonding

Description: State and local governments have been turning more and more to the capital domestic securities market to fund necessary infrastructure, particularly in response to cutbacks in federal capital infrastructure grants (Bradshaw 1987). Bonds provide about 10 percent of state highway funds, with approximately 25 percent of these funds being used for toll roads (as reported in 1992). The long-term municipal financing new debt issue market has grown substantially over the past 15 years, from $77 billion in 1982 to $170 billion in 1991.[Ref. 2] Transportation debt financing represents about 7 percent of total municipal debt, with debt incurred to build transit facilities consisting from 30 to 50 percent of the transportation bonds issued each year.

The purpose of debt financing or issuing bonds is to provide the necessary up-front capital to construct transportation projects.

The purpose of debt financing or issuing bonds is to provide the necessary up-front capital to construct transportation projects. Communities can issue bonds backed by a variety of revenue sources, including anticipated governmental grants, gasoline tax revenues, tolls, special assessments, stream of transit fares, etc. These bonds reflect the current market conditions for long-term debt and are also affected by the financial health of the issuing entity.

Benefits/Costs: By issuing bonds, the up-front capital funds are available to build more projects in a much faster time frame than is usually possible with a pay-as-you-go approach. Thus, community officials are able to encourage economic development or other opportunities that require upfront transportation investment, but which will contribute back to the general treasury through taxes. The issuance of bonds also means you are paying interest costs on the money being used and the volatility of the debt financing market can be a strong consideration if the timing is right for a bond issuance. In addition, many municipalities have a debt ceiling established for the total amount of debt that can be incurred for all funding purposes. For large-scale transportation projects, the total amount of necessary financing might thus be too great for debt financing.

Implementation: Because of the complexity involved with bond sales, a financial advisor is absolutely critical to the decision-making process. This advisor can recommend courses of action regarding short-term versus long-term market bonds, competitive versus negotiated sales, revenue versus general obligation bonds, etc. In particular, the federal laws concerning the tax-exempt nature of public bonds for infrastructure improvements constantly change. The advisor can provide the current status of how federal law treats the issuance of bonds.

The following factors are important considerations when considering debt financing versus pay-as-you-go: (Public Financial Management, Inc. 1992)

Factors supporting a *debt* financing approach

- Major imbalance in revenues and project requirements
- One-time project funding needs
- Strong local cash flow position
- Stable revenue sources
- Ability to withstand reduction in federal funding
- Need for additional project funding in current year
- Opportunity to reduce inflation impacts by advancing projects
- Inability to fund current program of projects
- Discipline in terms of investment of savings
- Projected ability to fund future capital program

Factors supporting a pay-in-you-go approach

- Level capital program requirements
- Level revenue flow matching capital program requirements
- Significant projected future capital needs
- Unstable revenue sources
- Little capacity to withstand reductions in federal dollars
- No identified inflation savings from project financing
- Existing ability to fund from cash
- Unsure as to the continued use of the asset
- High existing debt burden
- Lack of discipline to invest savings

References

Bradshaw, Jr,, Thomas. 1987. "Debt Financing," in American Association of State Highway and Transportation Officials, Understanding the Highway Finance Evolution/ Revolution, Washington, D.C., January.

Public Financial Management, Inc. 1992. Introduction to Public finance and Public Transit, Federal Transit Administration, Washington D.C., November.

Other Revenue Sources

(Targeted Taxes and Transit Revenues)

Description: Similar in nature to general revenues described earlier, targeted taxes are authorized by government for the sole benefit of sup porting facility/service development and/or operation. The best example of such a funding source is a sales tax that is applied in a specific jurisdiction or service area to support a local road program or to support a transit system. The rationale for such a concept of finance is that those paying the tax will either directly or indirectly benefit by the existence of the service being provided.

Transit system-generated revenue is primarily related to transit and similar services that charge for access to their facility or service. The typical example of this is the fare charged to ride transit. Other examples include station concessions, advertising on vehicles, and leasing property or right-of-way for uses such as fiber optic cable.

Targeted taxes are authorized by government for the sole benefit of supporting facility/service development and/or operation. The best example of such a funding source is a sales tax that is applied in a specific jurisdiction or service area to support a local road program or to support a transit system

A targeted tax provides a stable funding source over a multi-year period In addition, the tax can be indexed to inflation or designed to change as the economy changes.

A major benefit of transit revenues is that the agency often has direct control over the use of the funding mechanism, and can modify its use to achieve a variety of goals.

Benefits/Costs: The major benefit of a targeted tax is that it often provides a stable funding source over a multi-year period. In addition, the tax can be indexed to inflation or designed to change as the economy changes (e.g., a 1 percent sales tax). The level of funding often can be quite substantial In Atlanta, a 1 percent sales tax in the transit service area generates the majority of funding for the transit agency (Evans 1997). In Reno and Ft. Worth, sales taxes are used to support the bus operations. In Pullman, Washington, the transit operator receives revenues from a 2 percent tax on utilities which generated over $400,000 in 1996. This revenue was the largest source of funds to the agency. As with most taxes, there could be serious equity implications associated with who is paying the tax versus who benefits. In addition, increased taxation in one jurisdiction can create competitive advantages in another where such a tax does not exist. Thus, regional equity and the impact on development and employ ment patterns of increased costs of doing business should be considered prior to the use of a targeted tax for transportation funding purposes.

A major benefit of transit revenues is that the agency often has direct control over the use of the funding mechanism, and can modify its use to achieve a variety of goals. Taxes can be raised or lowered; vehicle advertising initiated or stopped. However, because many of these funding sources link closely to customer perception of the service being provided (e.g., cost of a ride, aesthetic quality of the ride, etc.), great care must be exercised in understanding the likely customer response to changes. There are possible benefits to the agency of making such changes though. The Virginia Rail Express, a commuter rail service in northern Virginia, began selling tickets through automated ticket vending machines. Officials found that money was collected much sooner and with a smaller transaction cost (Evans 1997). The Denver Regional Transit District (RTD) sells transit passes (called Ecopasses) to employers at a discounted rate based on the number of employees in the company. RTD thus receives revenue whether or not the employees use transit service. Iowa City Transit has a bus and shop program where downtown merchants pay for a patron's return trip if a minimum purchase has occurred. This program generates about $15,000 for the transit agency. In Pullman, Washington, the transit agency receives $35,000 annually from the school district which buys transit passes for students living more than two miles from junior and senior high schools. In Boston, the MBTA leases station space to concessionaires, and in Chicago and Albuquerque the transit agencies actively promote advertising on transit vehicles (in Albuquerque's case allowing newspapers to be sold on the buses). Importantly, all of the dollars raised in any of the ways described above can be used as local match for federal grants, operating subsidies, capital costs, or for any other discretionary purpose.

Implementation: Most targeted taxes require voter approval in the form of a referendum before they can be applied. This requires a good understanding of voter dynamics and desires before such a referendum is attempted. A checklist for successfully completing such a referendum is shown on page 308 in the Implementation section for Fuel Taxes.

As noted above, almost all of the actions that can be taken in the transit revenue category are at the discretion of the transportation agency. A careful study must be done to understand the implications of using these funding sources on the customers you are trying to attract. In some cases, for example, the leasing of property, legal issues must be examined before the action can be taken.

Reference

Evans, H. 1997. Funding Strategies for Public Transportation Transit Cooperative Research Program, Interim Report, Transportation Research Board, Washington D.C.

INNOVATIVE FUNDING SOURCES

The following sections discuss innovative sources of funding for transportation projects. Innovation in transportation financing has been found primarily in three areas: 1) new revenue sources; 2) new roles for the public and private sectors that support tapping new resources and include a greater role for the private sector in developing, financing and even owning facilities; and 3) financing structures and techniques that leverage existing revenue sources and encourage private investment. Many of the following funding actions are often discussed in the context of privatization or public/private partnerships. For purposes of clarity, each major action is discussed separately. Although many of these actions are often presented as alternative finance ing strategies that can be considered in the implementation of transportation projects, in reality, each action has very specific institutional requirements that greatly affect its applicability to an individual community or situation.

Vehicle Use-Based Taxes

Description: Although the traditional funding source for transportation is a tax on vehicle purchase and/or vehicle use (with fuel consumption as a surrogate), new technologies on vehicle identification and monitoring provide for some different approaches in assessing vehicle utilization. Three such taxes that have been proposed include a tax on vehicle miles traveled (the so-called VMT tax), an emissions-indexed VMT tax, and a congestion tax (Reno and Stowers 1995).

VMT Tax: Several states already levy taxes on heavy duty vehicles based on the miles traveled within the state, known as a weight-distance tax. This source of funding would allocate a mileage charge on a vehicle each year based on the number of miles that vehicle was used. This could be done with some sort of in-vehicle monitoring

innovation in transportation financing has been found primarily in three areas: 1) new revenue sources,. 2) new roles for the public and private sectors that support tapping new resources and include a greater role for the private sector in developing, financing and even owning facilities; and 3) financing structures and techniques that leverage existing revenue sources and encourage private investment.

device, or through the annual inspection / maintenance (I / M) tests for those urban areas having such programs.

Emissions-Indexed VMT: A fee would be charged at a rate determined by a vehicle's level of pollutant emissions. By so doing, emission fees would provide incentives for reducing vehicle miles traveled as well as improving the emissions generating characteristics of the vehicle. Under existing proposals (primarily in California), revenues generated with this method would be used to subsidize low income household transportation, support transit or ridesharing programs, and to support other environmental programs.

Congestion Pricing: Congestion pricing would levy a fee to an auto user based on the costs imposed on all travelers of the particular trip being made. Such a pricing scheme could produce very high levels of revenues for supporting alternative forms of transportation, See Chapter 5 for a more detailed discussion of congestion pricing as a demand management action.

New technologies on vehicle identification and monitoring provide for some different approaches in assessing vehicle utilization Three such taxes that *have been proposed include a tax on vehicle miles traveled, an emissions-indexed VMT tax, and a congestron tax*

Benefits/Costs: Table 7.1 shows the benefits and costs associated with each of these funding actions based on a likely scenario that would be found in a typical urban area. As can be seen, the criteria for evaluation relate to the types of impacts that would have to be considered if such actions were to be implemented. These criteria include the adequacy of the measure for funding purposes, the equity implications, the efficiency in producing desirable outcomes, the simplicity in administration, and implementation feasibility, all compared to the existing source of funding-the fuels tax.

Implementation: The implementation of these funding actions would require careful consideration of the possible equity impacts identified in Table 7.1. It is likely that a very specific proposed use of these funds to mitigate equity impacts would have to be part of any proposal. Although the automobile-using public is used to paying a gasoline tax, there is likely to be some opposition to changing the funding source to a VMT basis. A comprehensive education campaign would have to accompany any serious effort at implementing such a program. As noted in (Reno and Stowers 1995), the best approach for funding agencies is to augment the existing fuel-taxed base of transportation fundiig with such actions as VMT-based fees or congestion pricing, perhaps on a demonstration basis. The level of difficulty in doing this was illustrated in a recent survey of commuters in Los Angeles (Smith 1996). The conclusions of this survey were:

- Commuters viewed the present system of finance (i.e., gas taxes) as fair and was well-supported-there was no need to change.
- Moving from the gas tax to a VMT-based tax would require a significant program of voter education.
- Adopting a new pricing scheme requires development of a simple, fair, seamless, and user-friendly scheme.

Table 7.1: Relative Impacts of Alternative Funding Actions, *Source: Reno and Stowers 1995*

Criterion	Fuel Taxes	Emissions Indexed VMT Fee	VMT Fee	Congestion Fee
Adequacy & Tax Rate	Yes	Yes, no difference with fuel tax	Yes, no difference with fuel tax	Yes, if all roads are taxed, No difference with fuel tax
Stable and Predictable	Yes	Less stable; expected to decline as emissions fall, fuel tax more stable	Yes, no difference with fuel tax	Less predictable, depends on available untaxed alternatives
Responsiveness to Inflation and to Road Usage	Non responsive to inflation unless indexed; some response to VMT	Non responsive to inflation, responsive to emissions if constant emissions, emissions-indexed VMT tax more responsive to VMT	Non responsive to inflation unless indexed, fully responsive to VMT; no difference with fuel tax for inflation	Non responsive to inflation unless indexed; partially responsive to VMT depends on shift in travel; no difference with fuel tax for inflation,
Flexibility	Yes, can be adjusted	Yes, can be adjusted	Yes, can be adjusted	Yes, can be adjusted
Appropriateness of Dedication	Yes	Somewhat since also responds to air quality benefits	Yes, no difference with fuel tax	Yes, no difference with fuel tax
Point of Taxation/Incidence	Varies but not all taxpayers	Vehicle owners; many taxpayers	Vehicle owners, many taxpayers	Vehicle owners, many taxpayers
Compliance Cost (Cost of Paying)	Very low	$20 - $30 per vehicle one time cost	$30 per vehicle one-time cost, or $1 70 per vehicle check if ongoing reporting	$20-$50 per vehicle transponder, annual filing fee of $11, annual transaction fee of $78/vehicle
Potential for Tax Evasion	Gasoline 3-5% Diesel/Gasohol 15-25%	10% minimum	10% (perhaps greater)	Depends on extent of priced road network and technology used for recording and billing
Administrative Costs	$200 million for U S	$11 40-$14 6 for CA, higher if remote sensing used	$11 4-$14.6 for CA	$437-$874 million per year
Equity by Vehicle Class	May or may not be proportional to vehicle class cost responsibility	Unlikely to reflect vehicle class cost responsibility per mile; no real difference with fuel taxes	Can be set to vehicle class cost responsibility per mile	Can be set to vehicle class cost responsibility per mile
Equity by Income Group	Somewhat higher proportion of income spent by lower income groups	Greater incidence on lower income groups than fuel taxes	Slightly smaller incidence on lower income groups than fuel taxes	Inequitable if alt time/route not available for lower income travelers
Equity by Geography	Dependent on highway cost allocation results	Dependent on vehicle age distributions in different regions	Dependent on highway cost allocation	Rural travelers facing low congestion unlikely to pay full share of highway costs
Relationship to Econ. Efficiency	Partially promotes economic efficiency	Partially promotes economic efficiency	Partially promotes economic efficiency	Congestion fees most efficient of these funding actions
Ease of Implementation	Assumed high	Assumed low	Assumed low	Assumed very low

References

Reno, A. and J. Stowers. 1995. Alternatives to Motor Fuel *Taxes* for Financing Surface Transportation Improvements NCHRP Report 377, Transportation Research Board, Washington D.C.

Smith, D.J. et al. 1996. Pricing *Transportationo* Congestion: The Voters View, Southern California Association of Governments, Los Angeles, CA, March.

Public/Private Partnerships

A public-private partnership reflects any mixture of public and financial sponsorship that is different than the traditional public sector model of providing transportation infrastructure.

Description: A public-private partnership reflects any mixture of public and financial sponsorship that is different than the traditional public sector model of providing transportation infrastructure (FHWA 1994). Table 7.2 shows six models of highway funding that indicate the spectrum of private involvement in the provision of highway capacity (note that although these models are presented as highway projects, many of the same arrangements could be made for other modes). These include:

Traditional Highway Delivery: The program or project implementation process is characterized by public sector decision-making and financing.

Traditional New Public Toll Road: A public authority is established to own and operate a tolled facility where toll revenues are used to finance taz-exempt debt that was incurred to build the facility.

Innovative Financing for New Facilities: The public sector continues ownership and operation of a facility, but local benefits of the new facility are captured by development fees or exactions.

Blended Public-Private Financing for New Public Toll Road Delivery: A public authority uses some measure of debt financing to provide a toll road facility, but some limited private equity participation occurs.

Public-Private Partnerships to Deliver New Road Capacity: A substantial private equity participation and a strong private role in the structure, delivery, and operation of the project characterizes this arrangement. The public role is developing a concessions framework, contributing predevelopment costs and possibly assembling right-of-way. The govern ment will often assume ownership and then lease the operations of the facility to a private concessionaire.

Privately Supplied New Highways: Private finance and delivery is entirely in private hands, with project benefits accruing to the private concessionaire. Government's role is one of assuring safety and design standards and awarding the franchise.

For transit, public/private partnerships can include a variety of arrangements that are mutually beneficial to both parties. These include: (Public Financial Management Inc. 1992; Parker 1993; FTA 1997)

Cross Border Leasing: These leases involve the purchase and leaseback of U.S. public transit vehicles by foreign investors who get tax breaks in their own country.

Table 7.2: Six Models for Highway Development

Model	Justification	Structure	Finance	Risk Borne	Delivery
Traditional New Public Highway Delivery	System-wide needs	Public ownership and operation	Dedicated and general revenues.	By gov't and general public	Gov't directs- private contractors
Tradrtronal New Publrc Toll Road Delivery	Segment characteristics	Public authority owns and operates	Non recourse debt covered by tolls	By gov't and revenue bond holders	Authority directs private contractors
Innovative Financing for Public Roads	local project elated benefits	Public ownership and operation	Trad'l sources supplemented by fees	By gov't with some sharing through fees	Gov't directs contractors, some turnkey activities
Blended Public Pnvate Financing for New Public Roads	Local needs	Local inter governmental authority	Wide open blending, incl. trad'l sources and fees	Shared by local gov't. bond hold, ers, and subordi- nate lenders	Local-based authority using variety or private contractors and turnkey acrivities
Public-Private Partnerships for New Road Capacity	Local needs and project related benefits	Private with strong public role in framrng concessions	Wide open blending wrth substantial private equity	Shared public private	Largely private with gov't oversight
Privately Supplied New Highways	Return on investment and project benefits	Private with limit- ed public role on concessions	Largely private	By private devel- oper	Largely or entirely pnvate with reduced gov't oversight

Source. *FHWA 1994*

Certificates of Participation (COPS): This mechanism is used to better match the flow of revenues and outlays. A state-authorized entity issues bonds to a public agency to purchase vehicles. These vehicles are leased to the agency which makes semi-annual lease payments from a combination of local and federal funds. With a guarantee of future federal funds, the risk in the loan can be reduced and dollars saved in the interest that will be charged.

Joint Development: :Private develop ers agree to develop sites adjacent to or on transit property in exchange for easy access to transit service. In addition, transit agencies often receive revenues from lease arrangements or a portion of the construction cost covered by the developer (see Chapter 4 on Joint Development).

infrastructure Banks: State Infrastructure Banks (SIB) are infrastructure investment funds that are created at the state or multi-state level that can provide low interest loans, construction period financing, extended-term credit, pooled credit for small issuers of debt, and equip ment leasing pools.

Turnkey Procurement: In a turnkey project, a public agency contracts with a private entity to deliver a complete and operational project that will be publicly owned. Different methods can be employed to provide benefits to the private entity including real estate rights and revenues from the operation of the facility for a set period of time.

One of the aspects of innovative financing for all transportation projects is the "packaging" of different funding sources that often must occur for a total financing strategy to be developed. For example, Table 7.3 shows suggested sources of operating funds for a proposed transit line in Chicago. Not only does innovative financing relate to capital costs, but similar concepts can be applied to operating costs as well (Horowinz and Thompson 1994).

Benefits/Costs: In the context of the six models of highway public-private partnerships, the following sections will describe three major types of financing arrangements that have become the focus of professional interest over the past several years. These are development fees/exactions, toll roads and privatization. The benefits and costs for each category of innovative financing method will be described in each section. In general, the following benefits have been attributed to public-private partnerships (FHWA 1993).

Three major types of financing arrangements have become the focus of professional interest

- *Feeslexactions*
- *Toll roads*
- *Privatization*

- Private sources of funds can make public funds go further in supporting transportation projects in the region.
- Private investors can explore new and untested markets and initiate transportation projects where the government cannot.
- Private sector involvement introduces efficient opportunities for value capture and joint commercial development, and may be more likely to take advantage of innovative pricing, marketing, and service strategies.
- Private provision of project construction could proceed much quicker and more efficiently than under public procurement regulations.
- Private sector participation places a premium on life-cycle cost reduction via innovations in design and construction methods and the installation of new technologies such as intelligent transportation systems (ITS).

The benefits associated with the transit actions mentioned above relate primarily to savings in public costs. For example, the potential savings from cross border leasing range from 3 to 5 percent for used vehicles and 4 to 6 percent for new vehicles (Public Financial Management, Inc. 1992). Seattle METRO saved 5 percent of the price of buses with a cross border leasing arrangement, and New Jersey Transit received $4 million in a similar deal (Evans 1997). With regard to joint development, Metro Dade Transit in Miami has entered into a 99-year lease with a developer at two rail stations who included construction of a mall, hotel, office building and a convention center. The transit agency receives a guaranteed minimum rent between $150,000 and $400,000 each year, plus a percentage of the development's gross income. It is estimated that local governments receive about $1 million in tax revenues from these sites. An example of the benefits of turnkey construction is found in Snohomish County, Washington where a new bus operations base used turnkey procurement and saved the transit agency about

Table 7.3: Sources of Operating Funding for Transit Line in Chicago

Funding Operating Costs
Examples of Funding Sources

Beneficiary	Funding Source
Riders	Farebox Bulk sales
Property owners	Property tax special assessments Impact fees Joint development fees Mortgage recording tax Transfer tax
Business	Employment tax Business use tax Income tax Hotel/motel tax Rent
Vehicle Owners	Gas tax Parking tax Vehicle registration fees Traffic fines
Public Agencies	City general fund State appropriation Federal appropriation Transit agency funds
City Residents	Sales tax Wage tax
System Vendors	Advertising revenues concession revenues Rent

Source. Horowitz and Thompson I994

One of the aspects of innovative financing for all transportation projects is the "'packaglng" of different funding sources that often must occur for a total financing **strategy** *to be developed.*

half the cost of what would have occurred under a normal funding approach.

Two examples illustrate the benefits of innovative financing strategies for transit (FTA 1997):

Gateway Multimodal Transportation Center: A multimodal station in St. Louis is going to be constructed at a cost of $3 1.4 million. Project financing came from an ISTEA demonstration grant ($6.4 million), from the state highway fund ($7 million), and from a local sales tax ($8.4 million). The Missouri Transportation Finance Corporation will provide a loan of $18 million to start the project which will be repaid from the local sales tax. Given this loan, the project can be started right away thus saving dollars associated with escalating construction costs, and the construction period financing is being provided interest-free. By so doing, the Corporation is reducing the financing costs by over $1.7 million.

Arkansas TRANSLease: The Arkansas DOT established a revolving fund for the lease of vans to be used in its rural transit operations. The state provided $330,000, the FTA provided $270,000 and $150,000 in local funds were contributed. These vehicles were provided to 15 human service agencies. In addition to the cost savings associated with a pooled purchase, the revolving fund saved transportation providers more than $330,000 in accumulated interest costs over the terms of the leases.

Implementation: The use of public-private partnerships in financing transportation projects can create many issues and barriers that must be resolved before success will be achieved. Many of these issues relate to the assumption of risk that is affiliated with a project and the appropriate roles of government agencies and private investors in a project that will likely provide public benefits, but result in private investment return.

Some of the major issues or barriers to the development of these partnerships include: (FHWA 1995)

- **Financial Barriers:** Financial viability is a basic enabling criterion for private sector involvement. Financial risks include start-up financing problems, unsure facility usage levels and thus income streams, uncertain completion costs, general exposure to liability, and uncertainty of project scope as it wends its way through the environmental process.
- **Equity Capital:** The private equity capital market has its own lending operating procedures and constraints that could mitigate against a private investor obtaining investment dollars. In general, a parnership with a governmental agency is considered a greater risk investment.
- **Concession or Franchise Agreements:** These issues relate to governmental requirements for design and operation of a facility, risk assignment, regulatory oversight, provisions for public funding participation, tort liability, right-of-way, and agreement on default conditions.
- **Constitutional Powers of State Agencies:** State agencies have certain authority and limitations established in the respective state constitutions. Issues that arise here are the political complexities of competing jurisdictions, limitations on state contractual or police powers, and the limited flexibility in use of federal/state funds.
- **Procurement:** Government agencies are subject to stringent conditions on how goods and services are procured. Private entities often do not have such limitations. For example, a choice of contractor is often competitively bid under governmental rules, but can be sole sources in a private construction setting. Other issues include minority business participation, protection of intellectual property, and use of the design/build process.
- **Permitting Process:** Environmental clearances can often take a long time and potentially leading to a project being stopped. This process adds a great deal of risk to a private investor.
- **Tax Structure:** The combination of public tax-exempt financing with taxable private investment financing can add a high level of complexity to a project. Given that most costs for a large project are incurred upfront, and most benefits occur over a longer time frame, high tax rates on private investment creates added disincentives to investment.

The use of public-private partnerships in financing transportation projects can create many issues and barriers that must be resolved before success will be achieved.

- Community and Government Support: Public involvement is a requirement for projects involving federal dollars, and is required in most states as well. Such involvement, given the unusual nature of the financing arrangements, can be critically important in gaining the necessary approvals from government officials and agencies.

These barriers are important constraints to many public-private partnerships. However, there are strategies to dealing with them, including:

- Create an attractive investment climate
- Provide direct government support showing commitment to the project
- Develop community-wide support
- Provide start-up financing or other early development stage support by government
- Enhance tax incentives to use private bonding
- Provide government funding as a catalyst for public-private arrangements
- Develop innovative financing based on federal aid
- Look beyond tolls for revenue streams
- Expand the application of design/build approaches
- Establish and nurture ongoing communications with all concerned parties

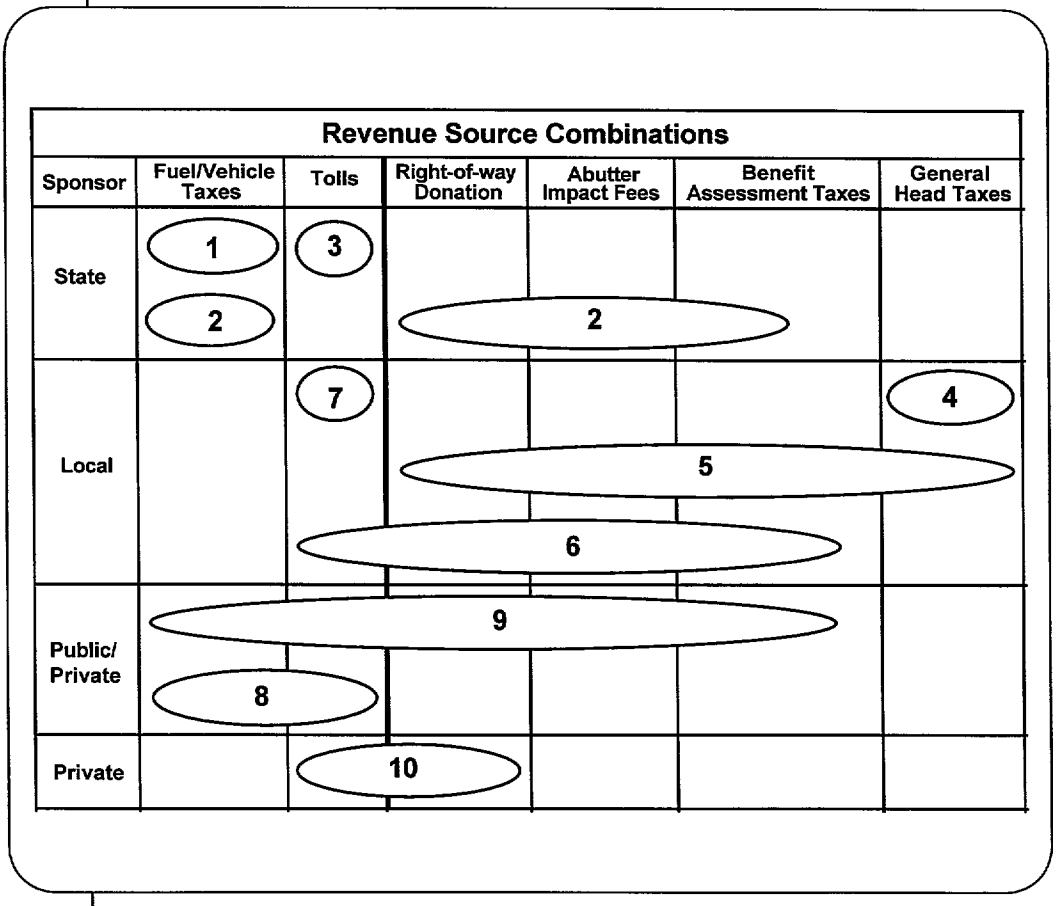
The key to success in public-private partnerships rests in three things-l) trust, 2) mutually agreed-to expectations, and 3) appropriate combinations of strategies to maximize willingness to participate (or alternatively minimize risk). Trust entails believing your partners will do what they say they will do for the reasons stated. Mutually agreed-to expectations is critical to ensure that trust is well founded and maintained. Different combinations of financing strategies are appropriate to provide the best fit for a specific project situation and for the specific partners involved. Figure 7-2, for example, illustrates the possible different types of financing strategies that are likely for different actors in project development (Lockwood 1995).

The key to success in public-private partnerships rests in three things- 1) trust, 2) mutually agreed-to expectations, and 3) appropriate combinations of strategies to maximize willingness to participate.

Figure 7.2: Revenue Source Combination Models

Legend

1. *Conventional public highway ownership with fuel/vehicle taxes*
2. *Innovative public/beneficiary mix, esp. transportation development corporations*
3. *Conventional public toll highway*
4. *Conventional public highway ownership through general taxation*
5. *Road utility districts*
6. *Local jurisdiction toll entity*
7. *Public toll highway with target in local jurisdiction*
8. *State franchised public/private toll corporations*
9. *Full public/private partnerships*
10. *Privatization*



Source Lockwood 1995

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Development Fees, Exactions and Value-Added Taxation

Description: This model of public-private partnerships entails the financial participation of private groups in the financing of a project where the participation is not voluntary, but is undertaken with an expectation that return on investment will exceed these additional costs. The most usual form of such financial arrangements include development fees, exactions, or some form of taxation related to the added value of land or development that now occurs because of increased accessibility due to the transportation facility. These financing arrangements take the following forms:

Assessment Districts-A special tax is levied on all property owners in a district (or on a street frontage) for an improvement that benefits primarily those specific owners, and which is approved by a majority of the property owners. Usually a district is sup ported by a municipality that issues revenue bonds and assesses property owners to repay the bonds. Chatham County, Georgia has established a specialty financing district to support transit services in Savannah, Georgia by applying an additional millage to tax rates on property in the district (FPA 1993).

Special Districts--This, in essence, is the same as an assessment district only with a governing body separate from the local government. Special districts have authority to tax, issue bonds, and provide services within a specified area. Special districts may be dependent or independent of the state, county or local governments through which they are established. Portland, Oregon uses Local Improvement Districts (LIDs) which are authorized by state statute (but not controlled by the state) to finance road and other improvements. A developer can initiate a LID, but 50 percent of the voters in the proposed district and the city or county must approve it. The LID then issues tax-exempt general oblig ation bonds, which are backed by the faith and credit of the city or county, and are also supported by a lien on the properties that are benefited by the bond revenues.

Development Agreements-These agreements are voluntary on the part of a developer to pay for itemized elements of transportation improvements in return for a public commitment to and assistance in removing as many impediments and delays in administrative approval as possible. Montgomery County, Maryland furnishes cash to finance required road improvements, and is then reimbursed either in cash per lot, payable upon conveyance of title to buyers of new houses, or by a deferred payment plan, which places so-called "road club" charges on homeowners' tax bills to be amortized over five to 10 years. Developers may choose the method of repayment to the county. Montgomery County requires that its "road clubs" be included in formal documents called public works agreements that identify the parties and set forth the responsibilities of the county and the developers

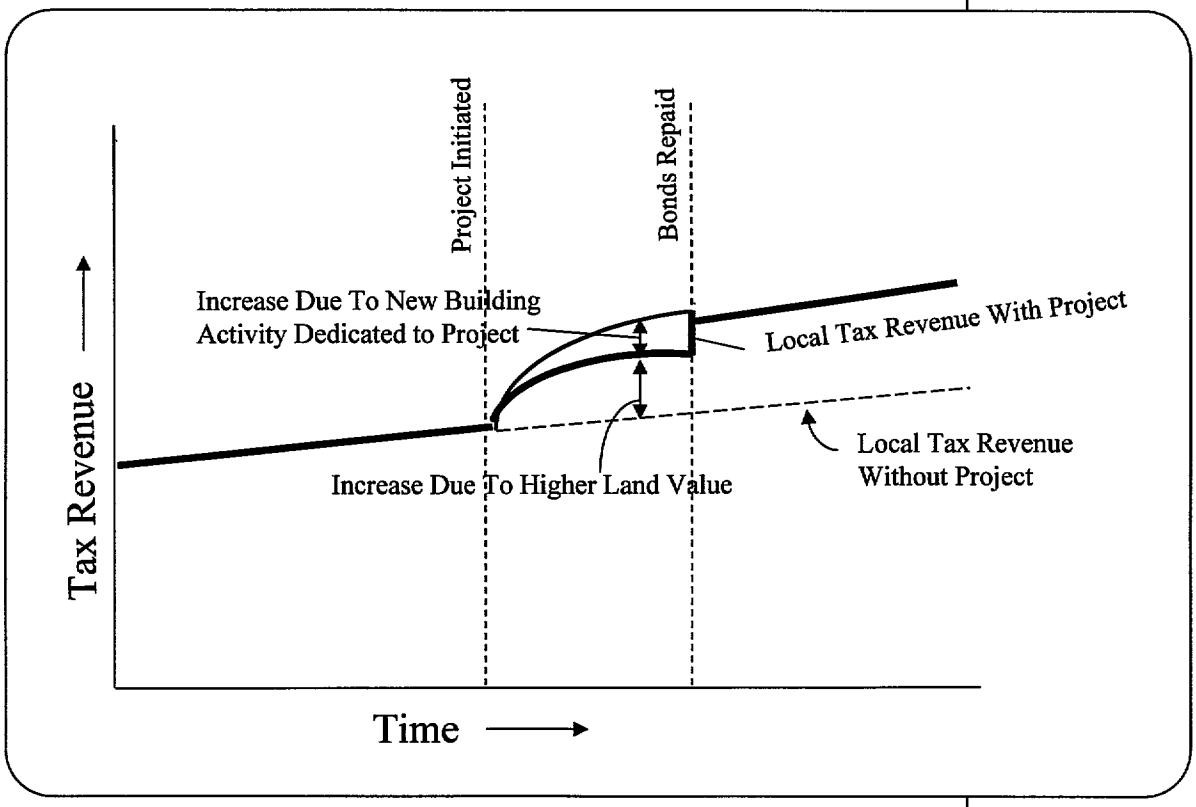
Development fees, Exactions and Value-Added Taxation is a mode/ of public-private partnerships that entails the financial participation of private groups in the financing of a project where the participation is not voluntary, but is undertaken with an expectation that return on investment will exceed these additional costs.

Development or Impact Fees- These fees are required contributions to compensate the community for the extra costs of public facilities that a development needs for effective site operation. Paid at the time of the building permit, the fees are placed in a fund designated for construction of certain types of facilities that can be linked to solving the problems caused by the development [for a good description of impact fees, see (Nelson 1988)] For example, Ft. Collins, Colorado requires developers to provide all streets internal to the owner's project, and in addition pay a street over-sizing fee for collector and arterial streets, set to recover the cost above that of a local street. These fees are currently (in 1996) set at $584 per residential and multifamily dwelling unit, $5,252 per acre of light industrial, $7003 per acre of heavy industrial, $10,504 per acre of office/general commercial, and $14,005 per acre of retail/commercial. Broward County, Florida imposes road impact fees that have survived court tests but which must be earmarked for facility expansion, preceded by planning, reasonably related to services received, and representative of a fair share of service costs. A computer model is used to determine what traffic will be generated by the proposed development. If the development will significantly increase traffic over existing capacity, the developer is required to pay a proportionate share of the costs required to increase the capacity of the road. (The developer is not required to pay for existing deficiencies in the road.) A developer may construct certain roadways and have them credited against the impact fee.

Tax Increment Financing (TIF)- Increased tax revenues that are realized as a result of new development in a specified area are earmarked for financing public improvements in that area. A district is defined with a base line of existing development. Improvements are paid with public funds or bonds, then repaid from increasing tax revenue from the new development. The basic concept of how such a financing scheme would work is shown in Figure 7-3, a proposed action for an upgraded highway in Pennsylvania (Greenbaum and Harknett 1991). Prince George's County, Maryland working within an overall limit on general property tax revenues, established a private/public task force which adopted a TIF proposal because the state had stipulated that funds raised through TIFs were not subject to county tax limitations. The first district was established to finance a parking garage for an AMTRAK station.

Benefits/Costs: These types of financing actions provide additional funds beyond those that would have been available. This means that more projects can be undertaken in a given jurisdiction. However, this additional funding often does not come without some limitations. Court cases have concluded that such funding must be tied to projects directly related to those contributing the funds. So, the impact of increased funding is local. Also, private sector contributions are made with expectations that projects will be implemented quickly. Such

Figure 7.3: Example of Tax Diversion Strategy



Source: Greenbaum and Harknett 1991

quick time frames can stretch the planning and engineering sources of the government agency. Possible equity implications also arise when public funding is assigned to projects to take advantage of private resources, thus causing more "needy" projects to go unfunded.

The following advantages and disadvantages were identified for the Chatham County assessment district described above which provide a good overview of the benefits and costs of most of these actions:

Advantages

- Provides a predictable source of funds for development-related projects.
- Provides a sufficient source of funds if initial fees and rates are set at a reasonable level.
- Eliminates competition between these transportation projects and other public services.
- The concept of "those who benefit pay" is politically popular.

Disadvantages

- Boundaries for assessment districts can be arbitrary and difficult to defend.
- It is often difficult to expand from the initial base district.
- It is often difficult to define who the beneficiaries are.
- Level of service and benefits may vary greatly from one area to another.

Implementation: Several of the public/private funding concepts discussed above require some form of legal authorization. For example, in many areas, the use of impact fees requires state legislative approval. One of the key questions in using these techniques is how much will the developer/private sector group be asked to pay? On what basis is this determined? A strong technical capability and legal counsel are critical for successful conclusions to public/private sector partnerships. Importantly, revenues from private sources are often project-specific (unless there is a jurisdiction-wide assessment district) and therefore are not a reliable or stable source of funding for regional transportation programs. A regional transportation program should therefore be cautious in relying on an assumed substantial contribution from private sector sources.

Several of the public/private funding concepts discussed above require some form of legal authorization. A strong technical capability and legal counsel are critical for successful conclusions to public/private sector partnerships.

Pennsylvania has developed a manual for guiding the development of public-private partnerships that provide some useful steps for successful implementation: (Pennsylvania DOT 1988)

- Establish a single point of responsibility for implementing a program
- Form an advisory group composed of relevant individuals and groups
- Select a financial advisor
- Develop realistic revenue estimates
- Develop refined revenue sharing allocations
- Establish agreements with local governments and property owners
- Prepare any necessary legislation
- Prepare financing plans for projects
- Establish Transportation Partnership with defined responsibility

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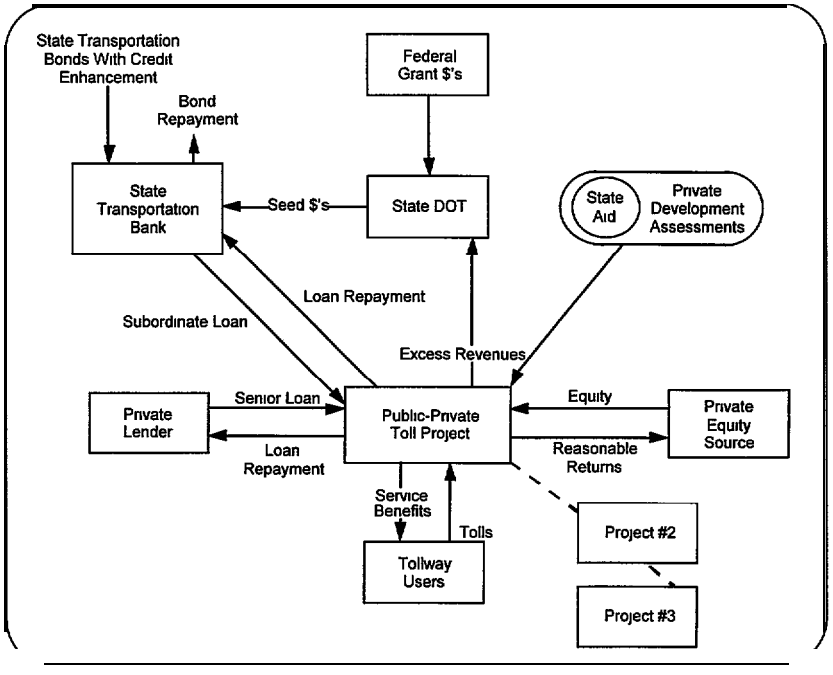
Toll Roads

Description: Charging tolls for the use of a road has been a time-honored means of paying for the construction and operations of a highway facility. As of June, 1993, there were 29 states operating 37 toll roads and 44 toll bridges with a total length of approximately 5,000 miles/8050 kms (FHWA 1993a). Today, many states are developing plans for new toll facilities with permission now available to use tolls on federally-aided highways which for years had been prohibited. The interest in toll roads is motivated not only by the possibility of alternative revenue sources, but also by the increased feasibility of toll collection using electronic toll collection (see Chapter 2) and by interest in congestion pricing (see Chapter 5). Perhaps the best example of the latter is the 91 Express Lanes in Orange County, California. This privately funded and operated 10-mile/l6.1 km toll facility is the first of its kind in the United States to use a electronic variable toll system to manage traffic flow. Tolls that are electronically collected vary during the day depending on the levels of congestion on the toll facility. For example, the highest fare is $2.50 beginning at 5:00 a.m. (which corresponds to the early peak use), drops to $1.50 at 9:00 a.m. and is then reduced to $0.50 at 11:00 a.m. Within two weeks of opening over 10,000 motorists were using the facility.

Toll roads can be financed in several ways-general obligation bonds, revenue bonds, revenue bonds sup plemented by income other than that paid by users, private financing, and combinations of the above. The collected tolls are then used to pay off the principal and interest of these bonds, or as shown in Figure 7-4 the toll project could be part of a much larger leveraged loan program that supports other projects (Lockwood 1995). It is important to note that ISTEA changed some aspects of the eligibility of toll roads for federal aid, so that such aid can now be part of some toll projects (FHWA 1993b),

Figure 7.4: Leveraged Loan Program Including Toll Road



Source: Lockwood 1995

The current public-private partnership models for toll facilities (but which could be expanded to include other types of transportation facilities) are:

Build-Own-Operate A private consortium finances, builds, owns, and operates a facility. The Ambassador Bridge between Detroit and Windsor, Ontario is an example of where the facility is privately owned and operated.

Charging tolls for the use of a road has been a time-honored means of paying for the construction and operations of a highway facility today, many states are developing plans for new toll facilities with permission now available to use tolls on federally-aided high ways which for years had been prohibited.

Build-Operate-Transfer: A private consortium receives a concession to finance, build, own, and operate a facility for a specified time period after which the facility is transferred to the responsible government agency.

Build-Transfer-Operate: Similar to above, only that the ownership of the facility is transferred to the government upon completion, and the consortium then leases the facility and collects revenues for some limited time period.

Buy-Build-Operate: A private consortium buys an existing facility from the government, upgrades it, and then operates it collecting tolls.

Lease-Develop-Operate: A facility is leased, upgraded, and operated by a private consortium for the duration of the lease. Ownership is continuously held by the government.

Temporary Privatization: A firm takes over operation and maintenance of an existing facility, improves it, and collects tolls until the cost of repair plus a reasonable return on capital is attained. Ownership is continuously held by the government.

The use of private investment allows a transportation facility to be built or improved with total or partial private dollars thus freeing public resources for other uses.

Benefits/Costs: The benefits of toll-based financing to society are discussed in Chapter 5 under congestion pricing. With regard to the benefits relating to public finance, the use of private investment allows a transportation facility to be built or improved with total or partial private dollars thus freeing public resources for other uses. If enabling legislation is already in place, toll projects can usually be implemented more quickly than other projects because the capital funding is available upfront and other efficiencies in contracting can occur. In addition, in order to receive financing, investors must show a stream of costs and revenues over the lifetime of the loan, thus ensuring careful consideration to life cycle costing and the corresponding costs associated with maintenance and operations. Finally, with advances in technology applications for vehicle identification, toll financing becomes an important public policy tool for achieving other societal objectives, such as those achieved through congestion pricing.

One of the important considerations, and in some sense a cost, associated with tolls relates to the equity implications of higher transportation costs on lower income households. As noted in previous sections, the incidence of toll impact is much greater on lower income than on higher income households. Mitigation of such an impact can occur through vouchers or possibly using some toll revenues for alternative transportation services (this would obviously have to be negotiated with private investors and lenders). Another impact that could become significant in some tolled corridors if the toll is perceived as being too onerous is the diversion of through trips from the tolled facility to parallel routes, thus causing additional congestion and environmental impacts in the surrounding areas.

Implementation: The use of tolls requires enabling legislation or authorization to permit their use for financing transportation infrastructure. Many states have such legislation, and others are putting laws in place [see (FHWA 1993b)]. Because toll road finance is heavily based on the issuance of bonds, legal and financial counsel is essential for those agencies considering toll roads. Inherent in this analysis of financial risk is the technical evaluation capability is much more rigorous for toll roads than that for similar non-toll roads.

Similar to gas tax increases, toll roads can meet political opposition. The major issue is double-taxation, the payment of a toll on top of federal and state gas taxes which are collected to build and maintain a highway system. Opposition to tolls thus comes mainly from those groups that represent road users such as automobile and truck associations, although in recent years many of these groups have come to realize that in a limited funding environment, such a financing scheme might be the only way of providing the necessary infrastructure.

Public attitudes have generally been favorable toward toll roads, mainly because those who benefit from the improvement are also pay ing for it. However, a program of tolling a regional highway network will likely meet some opposition. A survey of southern California voters showed some interesting results regarding voter opinions on changing the pricing system for the road system. The survey concluded that to be successful: (Southern California Association of Governments 1996)

The Problem Must Be Understood and *Imminent:* Voters must clearly understand the nexus between the pricing program and the problem it purports to address. Without some motivation to solving a problem, voters were significantly inclined to keep the current fuel tax-based funding program.

The Program Must Work: Assuming voters can be motivated to accept a change in finance, the new approach must be viewed as being effective in actually accomplishing congestion reduction and mobility goals. In addition to effectiveness, the survey showed that the financing program must be viewed as being simple, fair, seamless, user friendly, and that it is better than the current system.

Tread Slowly and Carefully Toward *Implementation:* Successful implementation of a new financing scheme must, 1) increase the intensity / awareness of the basic problem being addressed, 2) clearly explain the nexus between the solution and the problem, and 3) voters must have all of the program elements communicated and explained to them in a relatively easy and understandable way.

As noted in the report, the environment currently for changing financing strategies "must be mindful of the following basic voter predilections:"

- A very healthy overall skepticism that government can effectively implement such a program that will affect millions of drivers

Public attitudes have generally been favorable toward toll roads, mainly because those who benefit from the improvement are also paying for it.

- Voters' strong support for the current auto dominant transportation system
- Voters' strong support for the current gas tax approach to financing investment (60 percent thought this system was fair and equitable)

However, the conclusion of the report suggests that these considerations can be overcome with a carefully phased program of sophisticated research and development, documentation, pre-testing of basic concepts, and long-term public education and orientation.

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Privatization means shifting from publicly provided goods and services to private product/on. This can Include complete termination of public programs, sales of public assets to private investors, contracting out of services, and deregulating entry into activities that were previously treated as a public monopoly

Privatization

Description: Privatization simply means shifting from publicly provided goods and services to private production. This can include complete termination of public programs, sales of public assets to private investors, contracting out of services, and deregulating entry into activities that were previously treated as a public monopoly (Starr 1987). In many ways, privatization is not a new phenomenon to transportation in that many early roads and transit services in the U.S. were operated by private operators. Privatization of transportation facilities and services has the highest level of private involvement of public-private partnerships given that government agencies have very little role in the building and operation of a facility.

Benefits/Costs: Privatization has received a great deal of scrutiny in recent years with particular attention to who wins and who loses. As noted by one report, the most likely losers in privatization will be labor and to some extent landowners. The latter case is caused by a private owner's ability to extract land donations and other contributions to advance an enterprise (Gomez Ibanez and Meyer 1991). The winners in privatization are governments and taxpayers. Higher income tax payments would result from private facility holders rather than having tax-free financing. To the extent that private equity or debt replaces public equity, taxpayers who would have contributed that equity would gain from not having to make such an uncompensated contribution. More efficient operation of the facility or service might also provide economic gains to taxpayers. Investors would also gain if they are

able to capture the user fees and other revenues in sufficient quantity to provide a good return on investment. However, the largest benefits from privatization will occur where efficiency gains are the greatest and the private operator faces effective competition.

Implementation: The implementation of privatization must be done carefully with full recognition of who will gain and lose, and whether it is in the public interest to pursue such a course. The following guidelines were suggested by a national study of privatization: (National Academy of Public Administration 1989)

Guideline 1: Government reliance on the private sector to deliver public services is a legitimate and valuable feature of American govemment, and has been for decades.

Guideline 2: There are significant differences between the public and private sectors that make certain forms of privatization, or certain arenas of privatization, inappropriate.

Guideline 3: Privatization does not eliminate the need for public management; it only changes its character. As long as public funds or authority are involved, public accountability and control are essential.

Guideline 4: Privatization puts special demands on private managers that the private sector must recognize and accept in dealing with govemment.

Guideline 5: Just as the private sector must respect the legitimate responsibilities of government, so also must government respect the legitimate needs of its private partners.

The following questions have been suggested as a starting point for considering privatization of services (Wright 1987).

- Are problems with the service prompting the move to privatization?
- What operational characteristics will be forfeited?
- How do your local government and community feel about contracting?
- How much citizen contact is involved with the service?
- Is the city experienced with alternative service provision?
- If employees are to be displaced, will they be fired, transferred, or reduced through attrition?
- How will unions react to contracting?
- What is the service description and objectives?
- Is service well-defined and specified easily?
- What are the incentives for contractors to bid for this service?
- Can contractors provide service on demand or within pre-determined timetables?

Implemen ta tion of privatization must be done carefully with full recognition of who will gain and lose, and whether it is in the public interest to pursue such a course.

- Is there a significant cost advantage over a number of years?
- Are willing and competent contractors available?
- How is performance assured?
- Do other services depend on contractor performance?
- What service volume is expected?

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PUTTING IT ALL TOGETHER

The most likely approach for program funding is going to be a combination of a variety of funding sources.

The funding actions described above each have specific advantages and disadvantages associated with their use in funding transportation programs and projects. The most likely approach for program funding is going to be a combination of a variety of funding sources. For example, Pennsylvania has created a public transportation assistance fund at the state level designed to fund capital assistance and asset maintenance projects for transit properties in the state (FTA 1993). The revenue sources for this fund include a 12 mill increase in the Public Utility Realty Tax ($80 million), a 3 percent tax on auto leases ($45 million), a $2 per day tax on car rentals ($40 million), a 6 percent tax on magazines ($30 million) and a $1 tax on tires ($5 million). A transit property must provide matching funds equal to 1/30 of rota1 project costs, and the assistance funds can be provided in advance of actual need rather than on a cost reimbursement basis.

Another example of the packaging of funding sources is the Alameda Corridor project in southern California. This project encompasses $2 billion worth of investment in highways and rail lines that will improve the connection between the seaports of Los Angeles and Long Beach with the region's rail hub near downtown Los Angeles. The funding package for this project consists of revenue bonds ($735 million) that are issued by a transportation authority especially created for this project, port revenues ($400 million), a federal loan ($400 million), revenues from the metropolitan transportation authority ($347 million), funds from the state ($68 million) and from other sources ($87 million).

This project will reduce shipping delays and eliminate up to 14,000 daily truck trips; and it is expected to help create 70,000 jobs.

At a project level, many different forms of revenue can be considered. For example, the following possible

revenue sources were considered for a privatized beltway around Atlanta-project debt, toll revenue, investor equity, state/federal grants, donated rights-of-way, development fees, air rights lease, concession rights lease, fiber optic cable rights lease, fiber optic cable shared capacity lease, and tax increment financing.

A realistic, financially constrained transportation plan and program requires a comprehensive look at all serious sources of funds. This includes not only a comprehensive look at likely trends of public revenues (from other governments and from tax receipts), but also the likelihood of obtaining revenues from many of the above types of actions.

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INSTITUTIONAL ISSUES

Institutional capability is one of the key ingredients to successful implementation. Such capability can include not only appropriate organizational structures for carrying out project implementation, but also having the types of skills, analytical capabilities, and adequate process that are necessary to plan appropriately for project implementation, and to operate and maintain transportation systems once in place. This section discusses several important institutional issues that can either facilitate project implementation, or serve as barriers to implementing a project.

Organizational Capability: Government Agencies

Most of the actions discussed in this Toolbox require the active participation of state transportation agencies, transit providers, local transportation or public works organizations, and a myriad of other organizations with responsibility in the transportation sector. This responsibility can be either as a owner/operator of a facility/service or as a funder and supporter of the action. For example, not only is the state department of transportation (DOT) an implementer of many transportation projects and an important systems operator/manager, but it can also be a leader and legislative proponent in overcoming the legal issues associated with the implementation of innovative actions such as intelligent transportation systems (ITS). Thus, the state DOT becomes a critical player in congestion reduction/mobility enhancement program implementation.

For the first time, ISTEA required states to have a statewide transportation plan, although many states had such plans for many years. These plans were to be: long-term in focus, linked to the economic goals for the state, linked to environmental objectives, coordinated with all modes and transportation providers, intermodal, system performance-oriented, partici-

A key to successful implementation IS Institutional capability. This can include not only appropriate organizational structures for carrying out project implementation, but also having the type of skills, analytical capabilities, and adequate process that are necessary to plan appropriate& for project implementation, and to operate and maintain transportation systerns once in place.

patory realistic, and financially constrained (FHWA and FTA, 1996). Different factors were to be considered in the planning process such as coordinating state plans with metropolitan plans, studying access to ntermodal facilities, considering strategies for non-motorized transportation, identifying methods to reduce traffic congestion, and enhancing the movement of commercial motor vehicles. Many of these factors are very relevant for transportation actions that will be taken in metropolitan areas. State DOTs will also be a lead player in many of the innovative financing actions discussed previously.

Of all the organizations on the metropolitan area concerned with transportation, perhaps the metropolitan planning organization (MPO) has the most important role in developing a regional strategy for congestion reduction and mobility enhancement.

Table 7.4 shows the types of issues that state transportation officials and important stakeholders feel will likely be more important in the future (National Academy of Public Administration 1995). Note in this list that the role of technology, the requirements of federal legislation, environmental considerations, and financing top the list. All of these are issues that are encompassed in many of the types of actions discussed in this Toolbox (Meyer 1997)

Of all the organizations in the metropolitan area concerned with transportation, perhaps the metropolitan planning organization (MPO) has the most important role in developing a regional strategy for congestion reduction and mobility enhancement. The MPO is responsible for developing a regional transportation plan that, according to ISTEA, should consider the following 15 factors: (Humphrey 1995)

- Preserve and enhance existing transportation systems
- Conserve energy
- Relieve and prevent congestion
- Integrate transportation policies with land use and development policies
- Fund enhancements
- Include all transportation projects
- Make major connections with international borders, ports / airports, freight routes to modes, intermodal facilities, and recreational, historic, and military destinations
- Ensure connectivity of metro and non-metro roads
- Meet the needs identified through management systems
- Preserve right-of-way for future projects
- Provide for the efficient movement of freight
- Use life cycle costing analysis of proposed investments
- Transportation impact analyses
- Enhance transit services
- Enhance transit security

Table 7.4: Factors Likely To Drive Transportation Change In Future, Survey of State DOT and Stakeholders

Factor	CAO N=176	Other DOT N=433	Stakeholder N=925	All N=1,534
	Share of Responses			
Technology	12%	13%	12%	13%
ISTEA	16	12	11	12
Environment	12	12	12	12
Finances	12	12	11	11
Demographics	10	8	7	7
Economics	6	7	5	6
Fuel/Energy	2	5	6	5
Govt' Process	5	4	6	5
Congestion	5	4	5	5
Land Use	3	4	5	4
Internal Org	4	6	3	4
Public Concerns	3	3	4	4
Infrastructure	3	2	4	3
Travel Behavior	1	1	2	2
Other	7	6	7	7

Source. National Academy of Public Administration 1995

As seen, most of these actions are related to those discussed in this Toolbox. In addition to the regional plan, the MPO should- be a leading participant in major investment studies, with the public involvement component of an MIS conducted in accordance with the MPO's adopted public involvement process (FHWA 1996). In those areas that are in non-attainment of air quality standards, the MPO is often the delegated agency for developing and using a congestion management system (CMS) which is a process of identifying actions that will reduce congestion and enhance mobility, while at the same time not degrade air quality. Any new actions that will significantly increase the carrying capacity of single-occupant vehicles must result from the CMS process. The MPO and the U.S. DOT have the primary responsibility to ensure that the metropolitan transportation plan and program conform to the air quality plan, and thus the CMS becomes a key process for assuring that individuals projects help meet air quality goals.

The capability of the MPOs to participate effectively in a regional transportation planning process will depend on a large number of factors, including the analytical capability available to assess alternative transportation strategies, the acceptance by local decision-makers and agency heads of the MPO's role, and the ability and willingness of MPO staff to act as facilitators in regional transportation issues. Some of the challenges facing MPOs under the latest federal transportation legislation as noted in (U.S. Advisory Commission on Intergovernmental Relations 1995) include:

"Decentralization of decisions will give many MPOs a larger area to plan for, more miles of roads to make decisions about, more flexibility to consider alternatives to the automobile, a lead role in allocating certain federal transportation funds, a longer horizon to consider, and a responsibility to consider many transportation related public policies.

Environmental considerations will be much more of a driving force in the work of MPOs. Compliance with national air quality standards will become paramount for areas that do not meet them. Other federal environmental standards that will need increased attention from MPOs are protection of wetlands, cleanup of urban stormwater runoff, and transportation of hazardous wastes.

Non-traditional goals and stakeholders include a) international competitiveness, b) energy conservation, c) economic development, d) equality of access, opportunity and mobility for underserved and disadvantaged populations, e) historic preservation, f) neighborhood preservation, and g) renewed vitality of central cities."

This reference also characterizes "reinvented" MPOs as expanding their boundaries and memberships, rebuilding/expanding their planning programs, strengthening their public involvement, financially constraining their planning and programming, building an effective political decisionmaking capacity, equitably representing central cities, linking with others to form effective intergovernmental partnerships, and retooling their staff.

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Transportation Management Associations (TMAs)

Employers and developers have a critical role to play in better managing a community's transportation system. Not only are employment and development sites the location of significant employee travel, but the sites often attract large numbers of visitors and goods deliveries that create demand on the transportation system. Transportation Management Associations (TMA's) are partnerships between business and local government designed to help solve local transportation problems associated with rapid growth. TMA!s give the business community a voice in local transportation decision-making, build local constituency for better transportation, and serve as a forum or public/private consultations on issues of transportation planning, financing, and implementation (Ferguson and Davidson 1995; Ferguson et al 1992). They have become an important institutional forum for dealing with mobility, in particular in increasing commuting options to suburban employment centers that are poorly served by public transportation. TMA's offer a forum for public/private consultations on such varied issues as highway funding priorities, restructuring of public transit routes, improving transit service, minimizing disruption caused by road reconstruction, and mitigating traffic congestion. Some TMA's have been instrumental in launching innovative programs to help entry-level workers gain access to suburban jobs. Table 7.5 shows the types of activities that could be found in a TMA.

A good example of the roles that a TMA can play is found in the Greater Valley Forge TMA in the Philadelphia metropolitan area. Some of the activities undertaken by this TMA include: (Davidson 1993)

- Promoting public-private partnerships in providing transportation and transit services, particularly facilitating corporate subsidization of transportation projects
- Developing constituencies for major transportation and transit projects through public awareness campaigns and facilitating meetings with state transportation officials
- Developing inter-modal connections by providing user-friendly services for client transfers such as passenger shelters at bus stops
- Conducting transportation fairs in shopping malls
- Operating transit stores and marketing transit programs
- Helping to create park-and-ride facilities by aiding in the negotiations for public and private right-of-way
- Conducting public information meetings about the MPO's long range plans and about specific transportation projects
- Providing transit alerts and public service announcements on transportation for radio and television

Transportation Management Associations (TMA's) are partnerships between business and local government designed to help solve local transportation problems associated with rapid growth.

Table 7.5: Typical TMA Activities

Offer a Forum for Public/Private Consultation on:
Highway funding priorities
Minimizing disruption from road repairs
Transit service improvements
Traffic engineering improvements
Represent and advocate needs and interest of TMA members before public agencies, legislative bodies, and in the planning process
Monitor traffic conditions, and recommend appropriate"quick fixes"
Conduct employee travel surveys, assess commuter travel needs, and recommend appropriate changes in transit routing and level of service
Monitor development and employment trends, and assess their impact on future road and transit needs
Advise on alignment and location on new transportation facilities
Build local constituency for better transportation and raise funds for local transportation improvements
Promote and coordinate demand management actions designed to reduce peak hour demand on transportation facilities, and help TMA members comply with local traffic mitigating requirements (trip reduction ordinances, conditions of development permits, proffers, etc.)
Ridesharing
Variable Work Hours to spread peak hour traffic
Parking management
Transit marketing and promotion
Facilitate commuting and provide internal circulation within the area through:
Daytime circulators
subscription vans/buses
Short-term car rentals
Shuttles to commuter rail stations and fringe parking lots
Emergency transportatron for employees without cars
"Reverse commute" services for service employees
Provide specialized membership services to TMA members
Conduct employee "travel audits"
Provide relocation assistance to newcomers
Train In-house transportation coordinatiors
Manage shared tenant services, i.e. ,daycare centers, security sanitation, etc.

Source, *Ferguson, Ross and Meyer 1992*

TMA's give the business community a voice in local transportation decision-making, build local constituency for better transportation, and serve as a forum for public/private consultations on issues of transportation planning, financing, and implementation.

Preliminary experience with TMAs has shown that they do serve as a useful mechanism for focusing the energies of the public and private sectors on critical transportation problems. In many cases, they have successfully promoted government/employer contributions to transportation improvements. Most importantly, they provide a forum for the exchange of ideas that often lead to the implementation of commute options.

Two good examples of TMAs include the Contra Costa Centre Association and the Warner Center Transportation Management Organization, both found in California (Portland State University 1995). Contra Costa County identified a redevelopment area surrounding a BART station consisting of approximately 125 acres of land. Slightly over one million square feet of development has occurred at this site with more than 2,600 employees having access to 2,700 parking spaces. The Contra Costa Centre Association was formed to encourage employees to use alternative forms of transportation. The Association is funded entirely from developer exaction fees. The services it provides includes Carpool matching, transit information, vanpool formation services, and a variety of other support activities. From 1987 to 1995, the drive-alone share fell from 81 percent to 67 percent with equal shifts occurring from drive alone to carpooling, vanpooling, transit, bicycling, and walking.

Warner Center includes about 15 million square feet of development covering just over one square mile in Los Angeles. Over 40,000 employees work at this location. Given that this site could build out to more than 36 million square feet, the City of Los Angeles developed a plan for the planning, zoning, and development in Warner Center. Allowable parking, for example, is to decrease with reduced allowable parking for drive alone commuters, and increasing allowable parking for alternative mode users. In addition, Regulation XV which requires all employers with over 100 employees to implement TDM programs, has been applied at the Warner Center. The Warner Center TMO was created in 1989 to cover approximately 90 percent of the employees at the site. The TMO provides mid-day shuttles, child care, computerized carp001 matching, vanpool incentives (the TMO operates 65 vanpools), transit and rail pass distribution, commuter rail shuttles, a guaranteed ride home program, a bicycle club, marketing and promotional activities, and technical consulting to companies to establish their own employee transportation program. Since 1989, the drive-alone share has fallen from 85 percent in 1987 to 70 percent in 1995. Carpooling more than doubled from 10 percent to 22 percent; vanpooling went from 2.2 percent to 3.9 percent; transit went from 0.4 percent to 2.8 percent; and bicycling and walking increased by 44 percent, although the actual mode share was quite small. The largest absolute increase in alternate mode share occurred in carpooling.

TMAs, in many cases, have successfully promoted governmentlemployer contrtbutions to transportation improvements. Most importantly, they provide a forum for the exchange of ideas that often lead to the implementation of commute options.

Transportation Management Associations often fill an institutional void that is characteristic of fast-growing suburbs

The initiative to form a TMA may se sparked by a variety of motives and circumstances. In some cases, the catalyst for the TMA has been local employers and property owners who are concerned that traffic congestion could adversely affect the productivity of their operation and stifle the future economic prospects of the area. In other cases, the need for a TMA has arisen out of local ordinances that set traffic mitigation requirements on new development and obliged developers to come up with trip reduction strategies as a condition of going forward with their projects. TMA's enable their members to consolidate their efforts, pool their resources, and reduce the cost of compliance with local requirements through shared services and joint programs. In yet other cases, TMA's have been the outcome of decisions by developers, employers, property managers, and local governments to establish a vehicle for addressing local transportation problems on a cooperative basis and overcoming jurisdictional barriers that often stand in the way of area wide coordination.

Experience with TMAs suggests that there are several conditions that favor their creation:

- There must be a sense of a present or impending transportation problem (usually traffic congestion, although lack of commute alternatives can also be viewed as a problem);
- There must be strong corporate leadership that has a stake in preserving the economic and environmental well-being of the area and perceives traffic congestion as a threat to the continued viability of the area;
- The business community must perceive a benefit from pooling their resources and acting in concert;
- There must be a supportive public policy environment and sympathetic local government officials; and
- The TMA must have an energetic and imaginative staff.

Transportation Management Association often fill an institutional void that is characteristics of fast-growing suburbs. Many of these suburbs often have no perceived central civic establishment-an institution that articulates public needs and concerns in more established communities. TMA's can act as surrogates for traditional institutions as they relate to the transportation problems of their specific areas, and serve as spokespersons and advocates for under-represented interests. Entrepreneurial name, a TMA offers the promise of maturing into an instrument of advocacy well-suited to the realities of contemporary suburbia.

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Human Resource Development

The capability of transportation professionals to analyze the benefits, costs and societal consequences of all the actions described in this *Toolbox* will depend very much on having professionals with strong analytical skills as well as effective communication abilities. High turnover rates in transportation agencies thus provide challenges to transportation officials desiring to provide the most cost effective approaches to congestion reduction and mobility enhancement.

A Transportation Research Board study of state transportation officials found that the following skills and issues were likely to be critical to the success of their employees in the future: (Harder 1994)

- Providing leadership so that others will follow
- Serving customers as a primary mission of the organization
- Identifying ways to improve workforce productivity
- Involving employees more in agency actions to increase commitment to agency mission
- Working as team members
- Viewing the organization as a system and thus adopting systems perspective on agency operations

This study identified the following training and development needs for different levels of management: communication skills, leadership skills, teamwork training, strategic planning and management, decision-making and problem-solving skills, and technical analysis and personnel management skills. Marketing, employee retention, and workforce diversity training were also listed as possibly important skills. A survey of state transportation officials resulted in the training priorities for different levels of managers [see (Harder 1994)].

Agencies at the state and local level will need to explore human resource initiatives in the following areas:

Training-As top managers retire, mid-level professional will need to be trained for management responsibilities.

A TRB study identified the following training and development needs for different levels of management: communication skills, leadershrp skills, teamwork training, strategic planning and management, decision-making and problem-solving skills, and technical analysis and personnel management skills. Marketing, employee retention, and workforce diversity training were also listed as possibly important skills.

Shift in skills needed-The change in program emphasis from construction to system management, rehabilitation and maintenance means agencies will need to seek professionals with a different blend of skills than those hired in the post-war construction boom.

Upgrade computer use-Tougher design challenges in urban and suburban areas and the increasing flexibility of computer applications will require agencies to move toward more reliance on computer and computer skills.

Use of consultants-Many agencies are likely to explore the use of consultants for selected tasks like design, project management and special studies.

Working with local universities- Local universities provide a wealth of talent for transportation agencies. Agencies should work with the academic community to produce the types of professionals needed (Mason and Kostival 1994).

Having qualified, well-educated transportation professionals will greatly benefit local officials when technical analysis is necessary for determining the most appropriate course of action. Improved decision-making is the major benefit of this technical expertise. The costs associated with human resource development varies depending on the situation faced by a particular organization and the types of strategies adopted.

A 1984 conference on transportation education and training identified the following institutional barriers to the recruitment, development, and effective utilization of human resources in transportation (Transportation Research Board 1984). Although somewhat dated, many of these issues are still relevant today and become critical challenges to the implementation of effective human resource programs.

Salary Structure: The salaries of transportation professionals are well below those in other fields.

Diminishing Public Service Ethic: Lower salaries in the public sector were often compensated with the knowledge that professionals were contributing to society and were gaming valuable experience. Agencies must work to rekindle this ethic.

Rigid Hiring and Promotion Practice: Hiring and promotion practices in transportation agencies are often outmoded. An overhaul of these practices is necessary to provide opportunity for younger professionals.

Underutilization of Women and Minorities: A Large portion of the future labor force will consist of women and minorities. Appropriate programs need to be developed to foster more participation by women and minorities in the profession.

Undervalued Professional Development: Organizations should encourage and support employee efforts to obtain training or advanced educational degrees.

References

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PUBLIC INVOLVEMENT AND MARKETING

The development of a comprehensive transportation plan which includes all of the actions discussed in this Toolbox that are appropriate for a metropolitan area requires a good sense of who are the customers and stakeholders for the transportation system, and depends on a comprehensive program of providing opportunities for involvement in the planning process.

Public Involvement

The transportation planning process is based on proactive and continuous involvement of the many different groups and agencies interested in transportation decision-making. A variety of techniques can be used to provide the best opportunities for this involvement, including charrettes, advisory committees, transportation fairs, focal groups, media strategies, surveys and public meetings (FHWA and FTA 1994). Each MPO should have a public involvement plan that outlines the different types of techniques that will be used for different types of processes it is responsible for. State DOTs should also have a comprehensive public outreach effort that is targeted for different issues being faced by the agency. For example, the following strategy is suggested for developing a public consensus on a transportation finance strategy (Wilson et al 1994).

Identify the stakeholders in the transportation system. In this case stakeholders would include voters, commuters, freight operators, environmental groups, business community, developers, legislators, media, other government agencies, and key opinion leaders.

Identify those values or principles that motivate various transportation stakeholders. Voters may be concerned about tax burden; commuters about congestion; freight operators about system reliability and environmental groups about long-term costs and benefits of proposed actions.

Build a consensus from the bottom up. Seek input at the local level, then let issues rise to higher levels. Hold numerous small group meetings to gauge attitudes of stakeholders.

Build trust with the public. Begin public involvement processes in non-controversial areas and move into more unsettled topics as trust and relationships are formed.

Each MPO should have a public involvement plan that outlines the different types of techniques that will be used for different types of processes it is responsible for:

Create a sense of public ownership for the eventual solution. Broad support for a proposed finance program is more likely if participants in the process feel that they have a critical role in its development. The public is part of the solution.

Conduct public opinion research at sewed stages of *the consensus-building* process. Polls can be used to gauge public concern and awareness of transportation issues, and can give important input into appropriate implementation strategies.

Involve the media in the consensus-building process. Alert the media to the plans that are underway and develop a strategy to obtain media coverage of key events.

Inform and involve the state legislature, executive branch, and local government leaders. Involving these groups early helps identify points of conflict and consensus.

Compare what the public wants to what DOT professionals know the transportation system needs, and find places where these two areas meet. Once common ground is reached, a foundation is established for successful adoption of a total financing package.

Conduct further public opinion research. Confirm that the plan components still achieve public support.

Present plan to *public* and media. The presentation should emphasize the urgency of the plan and the role of the public in preparing it.

Anticipate attacks on *the* plan. Be prepared to answer questions that are raised about the appropriateness and adequacy of the plan.

The key to successful implementation of any aspect of a transportation plan or program is involving the public and key stakeholders. Table 7.6 shows the five major areas that transportation agencies need to consider in developing an effective communications strategy for a state DOT. These questions are the types of questions that most transportation agencies should consider when developing a communications strategy for plan or program adoption.

Table 7.6: Areas For Development in Communications Strategy

What is the situation?
What is the issue or project at hand ?
Who is affected by the Issue or project ?
What do those affected think and feel about the issue or project

- **Who are the issue's or project's supporters ?**
- **Who is the opposition?**
- **What are the relative strengths of each side?**
- **What are the Department's needs concerning the issue or project?**

What are the Department's goals?
What does the Department wish to accomplish?
What fall-back position can the Department accept ?

Who is the Department's audience?
Who are the groups that can affect the outcome of the issue or project?

What are the key messages of the Department's campaign?
What messages will strengthen support among those already in favor of the issue/project
What messages will gather support from those opposed to the issue/project?
What messages will sway undecided audiences in favor of the issue/project?

How can the campaign's key messages best be transmitted to the targeted audiences and thus accomplish the Department's goals?
What budget is allocated for the communications plan?
Where are the audiences located?
What is the most efficient distributioon method ?
What materials and distribution methods are most appropriate for the particular message ?

Source Wilson et al 1994

References

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Market Research and Marketing

Transportation actions that are designed to modify travel behavior are best developed with knowledge of the types of action characteristics that would most appeal to the target audience and the reasons that transportation customers might or might not adopt a specific travel behavior. This is especially true for transportation demand management (TDM) actions that focus efforts on changing travelers' trip-making behavior. The purpose of market research is to identify: who uses or might use a specific product, what qualities and features consumers want in a product, when and where they might use it, and why they use or would use it (Comsis 1993). The purpose of marketing is to disseminate information that is developed on the basis of market research aimed at encouraging travelers to adopt a specific travel behavior. Both efforts are critical to implementing effective transportation actions. Besides transit, some aggressive marketing activities have been done in conjunction with the use of HOV lanes (Billheimer et al 1994).

The purpose of market research is to identify: who uses or might use a specific product, what qualities and features consumers want in a product, when and where they might use it, and why they do or would use it.

The purpose of marketing is to dissemrnate Information that IS developed on the basis of market research aimed at encouraging travelers to adopt a specific travel behavior:

Surveys are the most frequently used marketing research technique for both developing a profile of typical users prior to implementation, as well as evaluating the implemented action. Typical questions asked in TDM surveys during development of a TDM program might include:

- How do commuters travel to work now?
- Why do commuters travel this way?
- What do they know about other commuting options?
- Which options do they view favorably, unfavorably?
- Would they be able to shift to another way of commuting?
- What would persuade them to shift?

Surveys conducted to evaluate the implemented action might include:

- Did commuters shift modes / times / routes?
- If so, was it because of the action?
- If not, what other factors influenced the change?
- If commuters did not shift to a commuting alternative, why not?
- What do they know about the program and how did they learn about it?
- Did they use specific incentives offered by the program and how do they feel about those incentives?

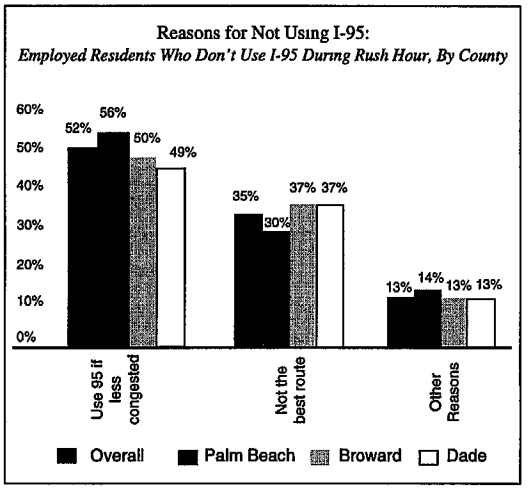
Some examples of recent surveys are shown in Figure 7-5. Note in this Figure that the survey was focused on discovering underlying reasons why travelers did or did not (or would or would not) adopt certain actions. This is a basic piece of information that is critical for understanding what is necessary in action implementation that will appeal to this target audience.

The following tips are suggested to maximize the response to a survey:

1. Keep the survey short.
2. Keep the survey simple
3. Arrange question logically
4. Simplify questions
5. Check survey accuracy
6. Respect respondents' privacy
7. Pre-test survey
8. Package survey for maximum appeal
9. Simplify survey collection
10. Maximize survey response

Based on the data collected from market research, a marketing effort should be developed with as many incentives provided as are reasonable to satisfy the needs and interests of the target market. As noted in the chapter on transportation demand management, for example, incentives such as a guaranteed ride home, travel allowances, preferential parking, and personal assistance in commute planning are considered important inducers of travel behavior change. They could thus become the basis for a marketing effort aimed at encouraging ridesharing or transit use.

A



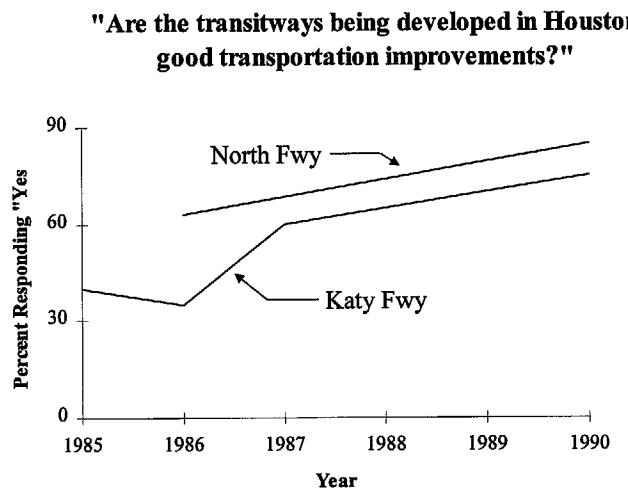
Source Florida Department of Transportation

B

Reason For Not Telecommuting	Frequency (n-79)
Job does not have flexibility	15
Lack of equipment	14
Prefers to work in office	12
Option not yet available to all	9
Some managers are resistant to program	8
Home environment not appropriate	7
Option not offered to all employees	5
Employees have not thought about/ or not asked about telecommuting	3
Other	4
Don't know	14

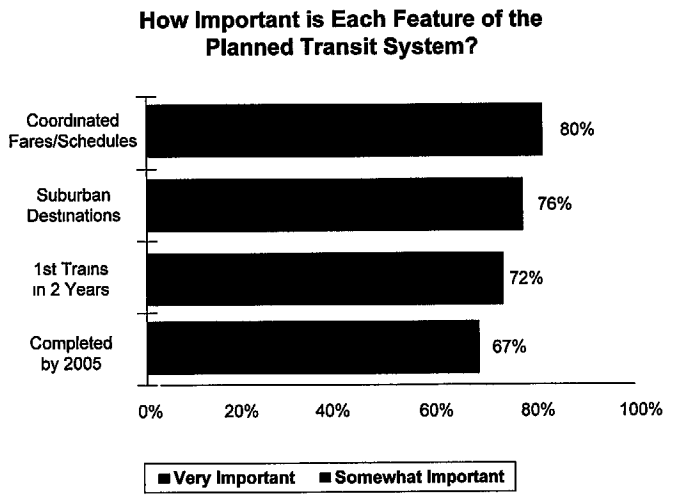
Source RPTA/Valley Metro, Phoenix, AZ 1996

C



Source: Texas Transportation Institute 1992

D



Source Regional Transit Authority, Seattle, WA 1994

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PUTTING IT ALL TOGETHER IN A REGIONAL PROGRAM

A regional program for congestron reduction and mobility enhancement should consist of actions that better manage the supply of transportation, actions that affect travel behavior; and in the longer term actions that can better manage urban development

The key challenge in developing a regional program for congestion reduction and mobility enhancement is putting together a program of all the different actions that can help achieve these goals that is reasonable and effective. As noted in Chapter 1, such a program should consist of actions that better manage the supply of transportation, actions that affect travel behavior, and in the longer term actions that can better manage urban development. Whether at the regional level or at a corridor / subarea level, all of these actions should be considered as part of the planning process. Certainly, the congestion management system for those metropolitan areas that have adopted one should examine these different types of actions on a comprehensive basis.

The following examples illustrate the approach that has been taken by some in packaging these different types of actions.

Maryland's Congestion Management System: The Maryland Department of Transportation has adopted a multimodal perspective on the identification of actions that should be considered to alleviate mobility problems in state transportation corridors. In particular, the congestion management system that has been developed for the state has identified seven categories of CMS strategies that should be considered to address congestion and mobility problems: (Maryland DOT 1995)

- Transportation demand management strategies
- Transportation systems management strategies that consist primarily of traffic operations improvements
- Public transit improvements
- Highway capacity improvements
- High occupancy vehicle lanes
- Measures to encourage the use of non-motorized modes

- Growth management and activity center strategies that relate to land use and development

These last strategies included directing new residential and commercial development to existing and planned village or town centers, achieve a jobs/housing balance, foster transit-oriented development, make redevelopment of existing centers a priority, preserve rural areas with conservation zoning, open space easements and transfer of development rights, and establish urban-rural demarcation lines. Transportation corridors where such actions would be considered include those with:

- Job/housing imbalance
- Abundant zoned capacity
- Deteriorated commercial cores
- Transit stations with undeveloped land or redevelopment opportunities adjacent to them
- Jurisdictions having strong plan and/or zoning ordinances
- High volume of non-peak trips
- Existing or planned controlled access facilities

Figure 7-6 shows the impact of the different elements of the U.S. 301 package of mobility improvements (Maryland DOT 1995).

Pennsylvania's Suburban Mobility Initiative: The State of Pennsylvania's Transportation Advisory Committee commissioned a study in 1991 to identify potential transportation management solutions to suburban mobility problems. Transportation management was defined as consisting of three actions: (Comsis 1991)

- Managing the link between transportation and land use
- Developing suitable alternatives to the single-occupant vehicle use
- Managing the transportation system to its highest levels of performance and efficiency through travel demand management and transportation systems management

The listing of strategies that seemed most relevant to this initiative included the following:

Supply Side

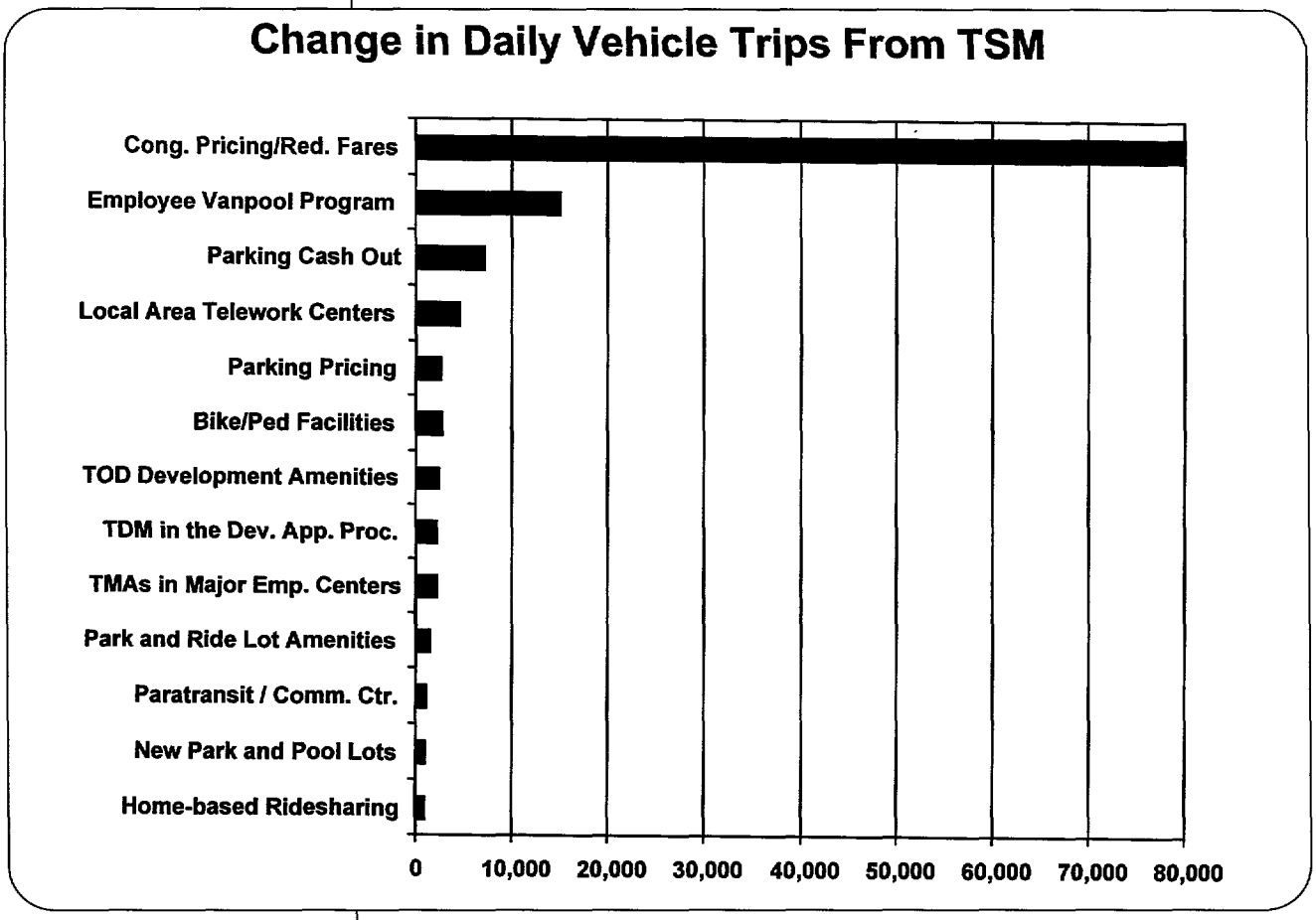
New Infrastructure (primarily long term)

- Strategic location
- Manageable
- Multi-modal

Transportation Systems Management (primarily short term)

- Traffic engineering
- Flow improvements
- Incident management

Figure 7.6: Impact of Different Elements of U.S. 301 Project



Source Maryland DOT 1995

Demand Side

Land Use Management (primarily long term)

- Balanced land use
- Infrastructure/land use integration
- Improved site design

Travel Demand Management (primarily short term)

- Improved alternatives
- Incentives
- Time management

Importantly, the study identified many of the barriers to the implementation of such an approach and suggested steps that would overcome these barriers. Barriers included no requirement in local planning to consider transportation management, no "champion" at the local level to implement transportation management, no legal or regulatory power to implement transportation management, inadequate funding, no incentives to businesses to alter employees' travel behavior, lack of analysis capability for these types of actions, and a general misunderstanding of the nature of the transportation problem and the mixture of actions which are necessary to solve it.

Dallas-Ft. Worth's Congestion Management System: The CMS for Dallas-Ft. Worth seeks a management solution to a growing traffic congestion problem by targeting resources to operational management and travel

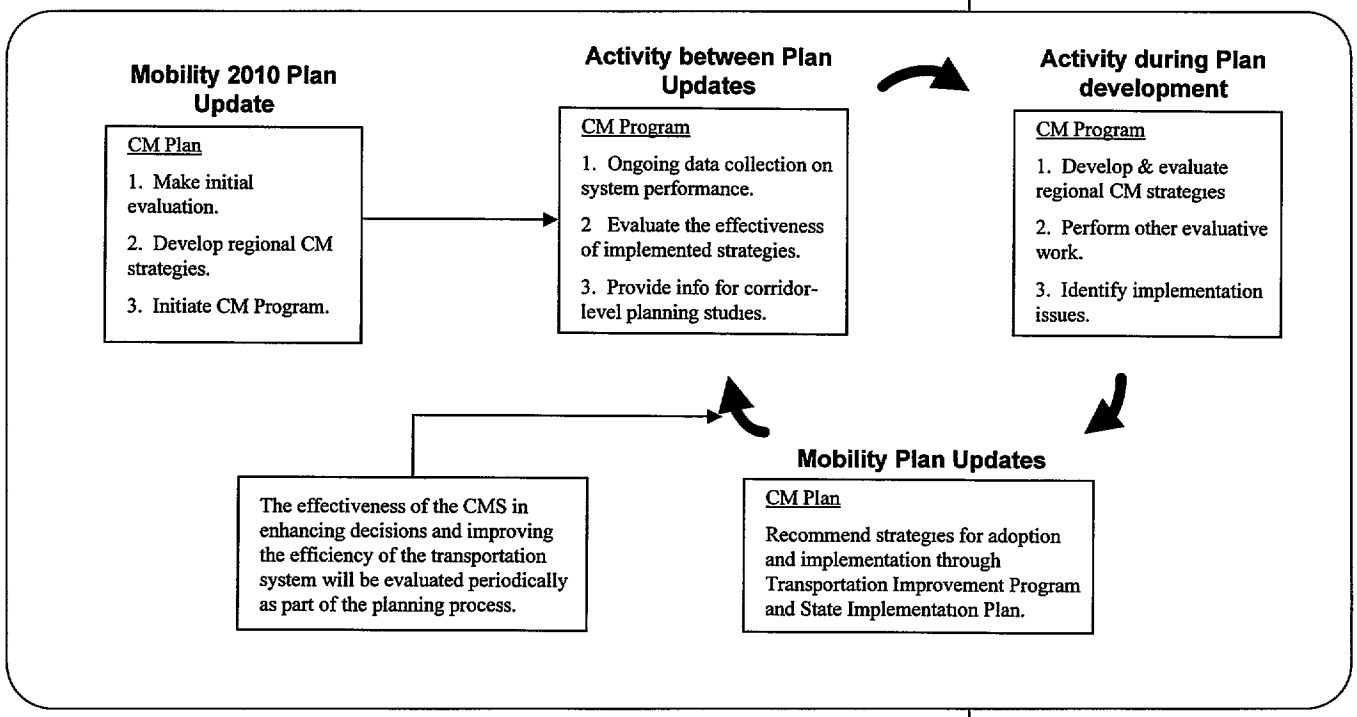
demand reduction strategies. The integration of the CMS into the regional transportation planning process is shown in Figure 7-7. As shown, the CMS will provide updates on the effectiveness of the implemented long range mobility plan, as well as monitoring transportation system performance (FHWA 1995). The institutional structure of CMS planning in this region is perhaps one of the more innovative aspects of how such planning is undertaken. Several standing committees of the MPO's policy board provide input on such issues as regional corridor management, regional travel demand management, toll road implementation, congestion pricing, specific corridor issues, and finance.

The MPO also provides technical information and regular updates to the Dallas Regional Mobility Coalition, a group made up of local governments concerned with transportation issues in their communities. The MPO also works with private sector organizations interested in clean air, telecommunications, and travel demand management.

CDTC's Arterial Corridor Management Transportation Strategy: The Capital District Transportation Committee (CDTC), the MPO for the Albany, New York metropolitan area, has adopted a strategy for better managing arterial corridors (CDTC 1995). The basic principles for this strategy include:

➤ *Access management*
- Reinforce street hierarchy
- Adopt driveway spacing guide lines for commercial corridors
- Adopt signal spacing guidelines along public streets

Figure 7.7: Integration of the Congestion Management System Into Regional Transportation Planning in Dallas-Ft. Worth



Source FHWA 1995

- Adopt a residential street design standard

- *Land use planning and coordination*
  - Strengthen municipal planning
  - Pursue policies that ensure accommodation of pedestrian, transit, and access management concerns in site planning
  - Improve agency coordination

- *Promote alternatives to automobile travel*
  - Improve pedestrian and bicycling environment
  - Routinely consider transit as an integral component of the transportation system when undertaking site development review and corridor reconstruction

- *Explore possible use of traffic calming actions to improve the livability of residential arterial corridors*
  - Incorporate landscaping and other enhancement techniques into project design
  - Explore the judicious use of traffic signals along corridors with moderate to high residential densities

- Support investment in access management improvements and other actions to promote overall *objectives* of arterial corridor management
  - Support investment in access management improvement
  - Expand local road network to include greater use of service roads and collector streets

- *Develop an outreach program that promotes access management principles and concepts*

This initiative resulted from a process of planning that included a wide variety of groups and interests. Efforts were made to make sure all affected constituencies were included in the process. The effort operated by consensus and focused on finding positions that the group could all support.

Portland's LUTRAQ Planning Process: In response to a proposal to build a new highway bypass around Portland, Oregon, environmental groups and concerned citizens formed an alternative planning process designed to focus on non-traditional solutions to transportation problems (1,000 Friends of Oregon 1997). This study effort examined many packages of transportation actions including the following five major scenarios:

- *No Build:* Assumes continuation of current land use plans and practices and the implementation of projects already committed.

- *Highways Only:* Assumes continuation of current land use plans and practices, but adds a major new bypass and approximately 50 other roadway expansion projects.

- *Highways with Parking Pricing:* Adds to the Highways Only alternative a parkiig pricing/transit subsidy package that discourages the use of single occupant vehicles,

- LUTRAQ Alternative: Existing land use plans are changed to focus future development around planned and proposed new transit services in a mixed use, pedestrian-friendly environment, and includes parking pricing and transit subsidy elements of above alternative.

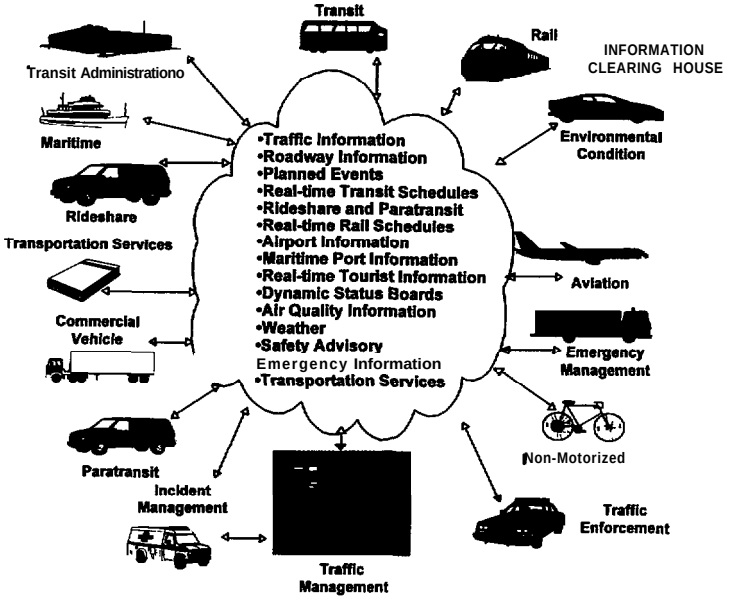
- *LUTRAQ With Congestion Pricing:* The LUTRAQ alternative with peak hour pricing applied to the region's highway system

The results of the analysis shows, not surprisingly, that the last altemative produces the least amount of vehicle-hours of delay on the region's highway system and has the highest transit ridership of the other altematives. It is of interest to note that the most effective alternative at reducing congestion includes both pricing and land use actions.

Southern California's ITS Priority Corridor: The Southern California Priority Corridor will showcase numerous ITS applications at the systems level. The corridor spans six counties in southern California having high levels of passenger and freight traffic. The purpose of the ITS showcase is to demonstrate the feasibility and benefit of integrating all modes of transportation and all roads of travel into an overall management system. The basic concept is shown in Figure 7-8. The corridor will be developed "as an areawide interactive/integrated intermodal transportation management and information system based on real-time, computer assisted transportation management information needed by the public.. . all agencies will be linked via an information/communications network.. and incident management will receive increased attention as the network grows"(Nuttall and Curnow 1997). The total estimated cost of improvements is approximately $108 million. Some specific elements of this showcase include:

- Advanced Transportation *Management System:* Links several CalTrans regional transportation management centers for coordinat-

Figure 7.8: Southern California ITS Priority Corridor



Courtesy of Odetics and NET Corporation, September 1997
Source: FHWA 1995

ed traffic management. This will also provide a backup control system in the event of an earthquake.

- *Commercial Vehicle Operations*: Establishes a CVO information corridor from Mexico to the L.A. basin using both kiosks and in-vehicle devices to provide information.
- *Rideshare Database*: Links the rideshare and transit databases maintained by separate agencies so that a much wider market can be served.
- *Traffic Coordination*: Coordinates traffic signal systems across several jurisdictions.
- *Intermodal Terminal Information* Enhances traffic management and implements a system to disseminate airport and freight terminal access information.

Building Upon Existing ITS infrastructure in Phoenix: Part of a federal model ITS deployment project, a project called AZTech integrates many of the transportation system management activities already on-going in the Phoenix region into one regional system (Nuttall and Curnow 1997). The management infrastructure already in place includes: a freeway management control system, some 2,200 traffic signals, transit automatic vehicle location devices, and an advanced traveler information system. The specific goals of the AZTech project were to establish a regional ATIS for the multimodal traveler and to expand the freeway management system from Phoenix to Tucson. This was to be done by:

- Developing a coordinated traffic management response to incidents and special events.
- Establishing a common reference point for synchronizing the region's traffic signal systems.
- Creating a central repository for roadway and transit information.
- Privatizing the region's ATIS system and extending coverage to 12 city arterial streets.

Importantly, the AZTech project is based on substantial private sector involvement. Private firms will be
- collecting, processing, and distributing traveler information; building communication links between the State DOT office and county/local transportation and transit agencies; and building the communications infrastructure to offer drivers in-vehicle information.

System Integration in San Antonio: As noted in Chapter 6, San Antonio's TransGuide system is one of the nation's most advanced regional traffic management systems. Opening in 1995 with 26 miles of Interstate highway under surveillance and central management, transportation officials are now expanding and integrating additional ITS technologies into the existing TransGuide infrastructure. The strategy is to adopt a "total trip" perspective on the provision of travel information. A traveler arriving at the airport, for example, would have information in kiosks in the baggage pickup area, taxis and rental cars will be equipped with in-vehicle route guidance, bus

stops next to hotels will provide real-time information to riders, real-time traffic information will be available through the Internet, and via a UHF channel. Over 100,000 transponder equipped vehicles and 53 AVI-equipped vehicles will act as traffic probes so that accurate travel speeds can be obtained on the region's road system.

TransGuide enhancements will also act as a communications facility for emergency management services. Two-way video teleconferencing will be available between hospital personnel and paramedics in vehicles heading to the hospital. Over 92 receiver sites will be constructed around the city communicating with three hospitals.

Smarter Travelers in Seattle:
Seattle's SmartTrek program will integrate seven features of ITS infrastructure including traveler information, transit management, electronic payment, traffic management and signal control, freeway management, and incident management. The goal of the SmartTrek program includes a travel time reduction of 15 percent throughout the region and a 25 percent improvement in distribution of traveler information. Multimodal congestion and transit data will be collected and disseminated to all jurisdictions. Real-time transit arrival time will be added at bus stations, information kiosks will be placed at strategic locations in the city, a cable TV channel will be devoted to travel information, and real-time information will be provided to Internet based dissemination that will also be given to service providers using digital assistants, two-way pagers, in-vehicle navigation devices, and interactive TV Individuals and companies will subscribe to this information business.

Over 30 public and private organizations will be participating in the SmartTrek program. The strategy for deployment is to provide a staged, flexible program development that integrates existing components and fills in system gaps where necessary.

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